ENVIRONMENTAL CONSEQUENCES

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ACTIONS COMMON TO ALL ALTERNATIVES

The impacts addressed below would result from adoption of any of the alternatives evaluated to guide the management of the Preserve. Many policy and regulatory changes occurred in 1994 as a result of the designation of the area as a unit of the national park system. These are already in place and would not change under any alternative. However, management of the Preserve with an overarching guidance document would result in better resource protection and improved visitor experiences.

IMPACTS ON MANAGEMENT OF THE PRESERVE

Mojave would undertake visitor and resource studies that would allow the development of carrying capacities where appropriate. Until that time, some resources or visitor experience may be adversely affected in limited areas where large numbers of people are attracted. At this time, the Kelso Dunes and the Mojave Road are the only sites where this potential currently exists.

Setting parameters for desired future conditions would help visitors understand where they can obtain a park experience that matches their expectations. It also would assist the park management to design monitoring and inventory strategies that would determine if the desired conditions are being attained.

The development of a five year Strategic Plan for the Preserve in 1997, and the preparation of annual performance plans and work plans has resulted in resource protection and visitor experience goals being established and projects identified to achieve those objectives. These documents also serve to advise the public and Congress of park activities and budget expenditures, and provide accountability by tying employee performance to these goals. Additional future site specific management plans would be prepared to carry out the intent of various management proposals identified in this document. These future site plans would address the specific impacts associated with the activity proposed.

Preparation of boundary maps and a legal description for the Preserve informs park staff, other agencies, organizations and the public of the specific legal location of the park as established by Congress. This information is needed for a variety of land management and private land development activities. Although no boundary modifications are proposed, the potential to include the Viceroy Mine area in the Preserve has been raised due to the impending closure of the mine. While this might not initially seem logical given the large-scale open pit mine and cyanide heap leaching occurring, it may be desirable from another point of view. This area was once part of the Bureau of Land Management's East Mojave National Scenic Area and is part of the Lanfair Valley viewshed. It is also critical for wildlife movement between the Piute Range and the New York Mountains, Castle Peak area. Bringing the area under NPS management would establish preservation goals for the lands, instead of multiple use, making the management of the area more compatible with the surrounding park lands. The National Park Service would also have more influence over future land uses and reclamation of the mine scars, although this may result in substantial expenditures of funds for this effort.

NPS management of wilderness and public information regarding wilderness areas has resulted since the initial preparation of wilderness maps from Congressional maps. NPS staff have utilized the maps for their field work, and roads into wilderness no longer available for motorized use have been marked. Public use maps are available and digital information has been provided to other agencies for their use. Together these activities have substantially increased public and agency knowledge of wilderness locations and have resulted in better wilderness management. The lack of legal descriptions has resulted in occasional questions about the specific setback of wilderness corridors from particular

features such as roads, railroads, and facilities. Final legal descriptions are being prepared and provided to Congress in accordance with the California Desert Protection Act. Any confusion about setbacks and specific locations of wilderness boundaries would be clarified by the legal description.

The current fire policy is to suppress all fires in the Preserve until fire history and effects studies are completed and a fire management plan is written and approved. This policy may not yield the most desirable resource benefits in all areas, but without adequate planning and research no data to support other options currently exists. Development of a fire management plan would provide management options that include full suppression, prescribed fire, natural fire managed to achieve benefits to natural resources, or a combination of these. Fire could be utilized as a tool to achieve resource management objectives, consistent with the priority of protection of human life and property. Cooperative interagency planning and research should provide better data for managing fire in desert tortoise habitat and previously grazed areas of the desert.

Disturbed land restoration is currently focused on inventory of abandoned mine lands and cleanup of hazardous materials as they are discovered. No comprehensive inventory program of other disturbed lands is underway. Restoration activities are undertaken only on an opportunity basis, with no priorities or goals established, other than national policies. Lack of a comprehensive inventory means little is known about the extent of nonnative invasive species on these lands, the extent and distribution of the disturbance, or the resulting impacts on resources. Completion of an inventory of disturbed lands would provide the data necessary to develop a restoration strategy. It would also reveal information about nonnative distribution and abundance and provide information that would position the park to compete for funding resources to undertake restoration efforts.

Many hazardous materials issues have been identified and are actively being worked on, or have been cleaned up. This program has significantly reduced the potential for additional resource damage from hazardous materials. A systematic, comprehensive inventory would also identify hazardous materials and include cultural and natural resource evaluations so as to facilitate planning and compliance.

Of the Preserve' s 1.6 million acres, almost 14% is private or state lands, and mining claims, and could be subject to development activities incompatible with the Preserve' s purposes. Developments such as mining, agriculture, or commercial development, would result in the loss of vegetation and wildlife and could affect surface water, and night sky. Disturbance of the surface soil could add particulates to the air, adversely affecting the air quality. No comprehensive land acquisition program is currently in place, although funding was received in FY 2000 to begin acquiring private land owned by the Catellus Corporation. This acquisition would result in the acquisition of 82,628 acres, of which about 63,000 acres is desert tortoise critical habitat and 15,400 acres are surrounded by wilderness. Exchange of state school sections as called for in the California Desert Protection Act has resulted in 15,066 acres of state lands being converted to NPS ownership and management. Another 35,398 acres is awaiting exchange. Since the state goals for these lands are to generate revenue through mineral development, grazing or sale, acquisition of these lands by the National Park Service would protect the resources and ensure activities compatible with park mission and objectives. No funding is currently available to acquire other lands. An active funded land acquisition program would serve to reduce incompatible development activities on private and state lands and mining claims. Where proposals would conflict with NPS management objectives or the mission of the Preserve, acquisition would be an option. Acquisition priorities would be established and the park staff would monitor development proposals through county planning and ensure park concerns are addressed. Catellus acquisitions and state school land exchanges would continue as addressed under existing management.

Initial partnerships undertaken by the park, such as the agreement with the Fund for Animals for burro adoptions and the management of the Granite Mountains Natural Reserve by the University of

California at Riverside, has enhanced park management objectives. The establishment of partnerships with other land managers, tribal governments, organized groups, universities, and private landowners would accomplish much greater ecosystem sustainability and achievement of park management goals than actions taken solely by park staff. Significant cost savings, both in dollars and staff, could be achieved through the effective use of partners in a variety of ways expressed in the proposal.

Sporadic communication with affected tribes occurs primarily on a project-specific basis. This approach often leads to misinformed decision-making and distrust because of a lack of information. The presence of sacred and traditional use areas is not fully identified or understood and therefore might be inadvertently harmed. Establishment of effective and routine communication and the sharing of information and knowledge about mutual interests in Preserve planning and operations and in managing cultural and natural resources would foster a better working relationship between the National Park Service and historically affiliated tribes. Over time, the Preserve would gain a better understanding of sacred and traditional use areas and be better able to provide protection in a manner respectfully tradition, beliefs, practices, and other Native American cultural values.

Recognition of past uses of the parks and wilderness areas by Indian people for traditional cultural and religious purposes, as called for by Section 705 of the California Desert Protection Act, and ensuring access for these uses may temporarily affect other park visitors if closures are requested. The act provides for temporary closures to the general public, upon request of an Indian tribe or Indian religious community, of one or more specific portions of the park or wilderness area in order to protect the privacy of such activities. Some visitor use may be temporarily affected if closures are requested by tribes to protect the privacy of cultural and religious practices.

The presence of NPS staff at the information center in Needles provides an opportunity to increase public understanding and appreciation of tribal ties to the Mojave Desert and to foster relationships with the tribes. Information provided at the Kelso Depot visitor center raise would public awareness of tribal ties to the Mojave Desert. Native American sacred sites would receive additional protection, and camping near those sites might be eliminated.

IMPACTS ON NATURAL ENVIRONMENT

The lack of resource protection criteria and a comprehensive inventorying and monitoring program results in management of resources with little or no systematic program to determine if adverse impacts are occurring. Without adequate programs to inventory and document sensitive resources and changes over time, subtle changes that are occurring may be overlooked for many years, resulting in adverse ecosystem changes. Adoption of resource protection criteria would provide standards against which activities could be measured to determine their appropriateness. These criteria would provide some consistency to management decisions. Implementation of a comprehensive inventory and monitoring program would provide necessary information on the status of natural and cultural resources to improve management decisions and to track changes in populations and ecosystem health.

By developing and adopting a set of guidelines for the built environment, the park would be committing itself, and suggesting to others, ways of developing facilities that are in harmony with the natural and cultural landscapes. The guidelines would result in facilities that blend with their environment rather than create dramatic contracts. The National Park Service would adopt sustainable use practices for water in the Preserve, thereby conserving valuable resources, but also educating park visitors and staff about water conservation and sustainable use. Over time, these policies would contribute to regional water conservation efforts and could help to reduce future water demand.

Known external threats such as the proposed Ivanpah Valley airport would have significant negative effects on the park if approved. This action, while not part of this plan, would nonetheless severely impact park resources. In order to protect park resources, good background data on the natural ambient sound must be collected before any new noise sources are approved. As with night sky, as the park initiates a monitoring system and develops baseline data, the argument for potential for no further degradation would be supported by hard facts.

By monitoring external threats and their potential effects on groundwater, the Preserve would raise issues of potential harm early enough in the permitting process for their effects to be addressed and considered. Where appropriate, mitigation would be sought. This process would help to avoid future impacts on park resources.

Most major impacts on park resources would be mitigated by the required environmental compliance responsibilities that the NPS must meet in approving projects in the Preserve. Projects would undergo a written impact analysis and public review, thus ensuring a thorough analysis of concerns and potential mitigation.

IMPACTS ON CULTURAL RESOURCES

Implementation of the baseline data gathering, collection management, compliance responsibilities identified would serve to document the cultural resources of the park in a manner that would allow for their systematic and prioritized protection. Significant properties would be identified and funding for their stabilization, rehabilitation or restoration sought. Interpretive material would be accurate and significant sites could be established as visitor destinations. Any artifacts that are collected would be properly archived in accordance with federal regulations and policy, thus ensuring their long-term preservation. Projects undertaken in the Preserve would adequately document and consider impacts on cultural resources.

IMPACTS ON VISITOR USE, SERVICES AND FACILITIES

Adoption of sustainable design guidelines would ensure the conservation of park resources while providing for maximum visitor enjoyment.

Military overflights would continue over the Preserve at no more than their current levels. Major conflicts with visitor use or resource protection would be identified by participation in the interagency overflight working group and methods identified to mitigate these impacts. Opportunities to be made aware of major training exercises and to provide this information to the visiting public would be enhanced. Visitor understanding of the military training mission in the desert would be enhanced by providing by including information regarding the military presence and use in interpretive materials.

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

None of the actions identified under this section would result in any significant impact on the socio-economic environment.

IMPACTS ON ADMINISTRATIVE OPERATIONS AND FACILITIES

Cooperation and interaction between the National Park Service and the military would provide a forum for communication about issues and concerns, potentially leading to resolutions of concerns before they become conflicts.

IMPACTS ON EDUCATION AND RESEARCH

Visitors, educational institutions and the National Park Service would all benefit from the adoption of partnerships to operate and manage two facilities in the Preserve for the purpose of providing education and research. The proposal would continue the operation of the Granite Mountains Natural Reserve and the Soda Springs Desert Study Center under cooperative agreements with the National Park Service. Cooperative agreements would formalize the relationships between the state and the National Park Service, and recognize each entity's needs and desires in the partnership. These institutions have brought world-renown researchers to the Mojave Desert and have produced extremely valuable data on desert ecosystems. By having cooperative partnership agreements the proposal would continue and potentially enhance this relationship, bringing valuable research expertise to the Preserve. In addition, these institutions have provided educational opportunities for thousands of individuals on desert ecosystems. The proposal would enhance the education and outreach potential of the Preserve by introducing the NPS and Preserve mission and objectives through programs offered by the university. Sharing of staff and resources would produce gains for both entities that would not be achievable separately.

IMPACTS ON LANDOWNERSHIP AND COMMERCIAL USE

Private lands would be acquired from willing sellers when funds became available. Properties would be purchased at fair market value. Over 300 of the 1,200 landowners have notified the National Park Service of their willingness to immediately sell their property. Reduction of nonfederal ownership would result in fewer instances of visitor trespass problems for private landowners and greater management control of resource use in the Preserve. Full implementation of this alternative, assuming many of the landowners would be willing to sell, would result in about 170,000 acres of additional public lands being available for visitor use. As of June 2000, approximately 82,628 acres of this total was acquired from Catellus.

Proposed development of private land that is incompatible with the purpose and mission of the Preserve, or causes unacceptable adverse impacts, would be opposed by the National Park Service. The *Land Protection Plan* identifies criteria for determining whether a project is incompatible. This policy could frustrate and upset some landowners who prefer to develop their property without governmental interference.

Implementation of the regulations prohibiting solid waste disposal within the Preserve would have little direct impact since no facilities currently exist. It would ensure that no future landfills are permitted in the Preserve.

ALTERNATIVE 1: PROPOSED GENERAL MANAGEMENT PLAN

IMPACTS ON NATURAL ENVIRONMENT

Mojave National Preserve' s native plant and animal populations would benefit from many of the actions proposed under this alternative. This is especially true of the burro removal and grazing acquisition proposals. Burro removals have been occurring since 1997, and would likely be completed by 2002. However, it must be recognized that acquisition of grazing permits through conservation organizations and the retirement of livestock grazing and associated water rights on those permits as they are donated would not occur immediately upon signing of the record of decision. This process could take several years to complete and the grazing impacts cited under alternative 2 would continue for the interim in areas of Mojave where grazing remains. Discussions with willing seller ranchers have been initiated and the first grazing permit has been successfully purchased by the National Park Foundation using donated funds. The permit and water rights were donated to the NPS and subsequently retired permanently. Cattle are being removed from the area, and when considered with other permits retired, grazing in the Preserve has been reduced by 15% since 1994. This is the lowest level of grazing that has occurred in the Preserve in almost 140 years.

Air. Nothing in the current proposal would cause any significant negative effect on the existing air quality of the park. Although air quality would not change immediately upon adoption of this plan, the park management would change from reactive to proactive, as funds are obtained. Incremental changes in soil disturbing activities, requiring restoration, removal of burros and not allowing off-highway vehicles, would allow existing scars to heal and reduce the primary source of air pollution, particulates. The park would encourage and support air quality data collection and would seek to increase the level of protection by soliciting class I status. This status could protect the air quality of the future by requiring developments that would affect the park to mitigate their emissions. There would be short-term impacts from dust caused by construction activities at Kelso Depot, but mitigation efforts such as watering excavation work would minimize dust levels. Long-term effects on dust generation would be beneficial as parking lots are surfaced.

Visual Quality. Nothing in the current proposal would cause any significant effect on the visual quality of the park. For the foreseeable future, nothing is likely to change in regard to existing intrusions such as the electric utility towers. Visual aesthetics would change over time as the native vegetation and soils recover from burro and cattle grazing. The time that would be needed to complete the natural recovery process is unknown.

Night Sky. Nothing in the current proposal would cause any significant effect on the night sky. Some continuing degradation of the night sky can be anticipated from external sources, even though the park would work with permitting agencies to get light pollution mitigated. As the park initiates a monitoring system and develops baseline data, the argument for no further degradation would be supported by hard facts. By adopting standards within the Preserve that set an example, and by researching and providing data on existing technology, the park could facilitate cooperation in the effort to protect the dark sky.

Natural Ambient Sound. Nothing in the current proposal would cause any significant effect on the natural ambient sound of the park. Noise from occasional military overflights would continue, however, participation in the interagency Overflight Working Group would provide a forum for discussing and possible resolution of significant issue.

Soils. Soils have been damaged to varying degrees in the Preserve by historic and existing activities (see "Existing Management Impacts"). Although minor new disturbance would occur for facility development or improvement, such as at Kelso Depot, the overall situation for soils under this alternative would be towards improvement. Adverse impacts on soils would be limited by the use of previously disturbed areas for construction. The landscape surrounding the Kelso Depot and the properties proposed for acquisition have been heavily impacted from previous vehicle traffic and people walking on these sites. About 2–3 acres of land that is now private property could be disturbed by construction of parking, walks, and new visitor facilities.

Where new developments are proposed, sites with existing disturbance would be preferred over undisturbed sites. Most of the new disturbance would be covered by the development itself, thus eliminating potential airborne dust, or would be mitigated by accompanying restoration. Site specific impacts for these developments would be addressed in separate detailed site plans and environmental analyses. Restoration of disturbed lands in the Preserve would offset any new disturbance that may occur as a result of new development.

Burros have severely damaged some areas of the Preserve with trailing and wallowing. The existing removal of over 2,354 burros and the continuation of the trapping program to achieve a near zero population over the next few years, would result in no further damage and would allow the healing process to proceed. Some areas where compaction has occurred would take much longer to recover, and may actually get worse, with gullying and erosion likely in wet years. As grazing permits are acquired and cattle are removed, soils would also begin to heal. This would be especially noticeable around livestock-watering tanks and corrals.

Education and enforcement efforts would continue to eliminate illegal off-highway vehicle usage in the Preserve, but some damage would likely continue for the foreseeable future. Vehicle use on dirt roads and maintenance activities on maintained roads and utility corridors would continue to disturb soils. All new mining operations would be addressed under separate impact analyses and permitting, and would include reclamation provisions to restore the site following mining.

Water. Nothing in the current proposal would cause any significant effect on the water quality or quantity of the park. As burros were removed and grazing reduced through conservation organization purchase and donation, more water from natural sources would be available for wildlife use and vegetation. Contamination of water sources by burros would be eliminated. Acquisition of grazing permits would include the purchase of the water rights. The National Park Service would convert the right to the name of the United States and utilize the water for wildlife benefit. As livestock tanks, troughs, and guzzlers were removed (if studies indicate that wildlife and vegetation would not be adversely affected by their removal), the environment would start a restoration process. An immediate and dramatic change would occur at the sites where these water developments are removed and riparian vegetation is allowed to recover. Over time wildlife populations would adjust to changes in water availability, and a desert much more typical of a pre-Columbian era should result. No existing guzzlers are planned to be removed under this proposal. Future studies would determine the impacts from removing or retaining guzzlers.

Drilling a new water well to an estimated depth of 700 feet to support the Kelso Depot would place a small additional demand upon the groundwater. No effects on natural resources or surface water sources would likely result from the use of water at this depth.

The rehabilitation of the Kelso Depot would result in some floodplain modifications to reinforce the existing flood protection dike. Armoring of the dike is required to prevent erosion during storm events. This work would not result in significant new changes to the floodplain over existing conditions.

Paleontology. Nothing in the current proposal would cause any significant effect on the paleontological resources of the park. A systematic program of inventory and documentation would provide necessary data for park staff to protect and interpret these resources. Increased knowledge of these resources would be gained through programs that encouraged research and collaborative partnerships. Existing vandalism and damage by burros and cattle would be documented. Potential new damage to these sites would be reduced as burros are removed and cattle grazing permits are acquired by conservation groups and donated to the park for retirement.

Geology. Nothing in the current proposal would cause any significant effect on the geology of the park. A systematic program of inventory and documentation would provide necessary data for park staff to protect and interpret these resources. Increased knowledge of these resources would be gained through programs that encouraged research and collaborative partnerships. Mojave would protect geologic features (such as rocks, soils, mineral specimens, cave and karst systems, canyons, sand dunes, dramatic or unusual rock outcrops and formations; and fossilized plants and animals) from the adverse effects of human activity, while allowing natural processes to continue. In Mojave, recognition of valid existing mineral rights may affect our ability to prevent all adverse effects, unless they are deemed significant, or funding is available to purchase the valid right.

Caves. Nothing in the current proposal would cause any significant effect on the caves of the park. A systematic program of inventory and documentation would provide necessary data for park staff to protect and interpret these resources. Increased knowledge of these resources would be gained through programs that encouraged research and collaborative partnerships. Continued cooperative relationships with the California Department of Parks and Recreation in the management of Mitchell Caverns would improve interagency knowledge of such resources and expand each agencies expertise by exchanging information and utilizing experienced staff.

Flora. Native vegetation would not be subjected to continued grazing pressure from burros as the trapping program continues and a near zero population is achieved by 2002. Burros have been consuming in excess of five million pounds of dry forage in the Preserve each year, on top of the livestock authorization. As conservation group acquisition of grazing permits occurs from willing sellers, cattle would be removed and the vegetation in these areas would no longer be subjected to any grazing pressure from nonnative animals. However, until the permits are acquired and retired, impacts similar to the existing management discussion would continue. The continued use of feeding supplements on remaining allotments would result in the same impacts on native vegetation addressed under alternative 2, existing management.

Wildlife. Competition for food and water with nonnative burros would be eliminated as the burro removal program eliminates the feral burro population. Access to water sources, unimpeded by the presence of burros, and recovery of native vegetation, would produce positive changes to the environment that should improve habitat for all native wildlife. Removal of livestock-watering devices from retired permits may have short-term negative effects on wildlife populations that are accustomed to utilizing them. However, since ranchers have routinely turned off waters to manage their cattle operations, the effects on wildlife would be minor. Removal of these devices would allow the water to be retained at the natural sources and would create a more natural, self-sustaining desert ecosystem with native populations. Not allowing additional guzzler installations for wildlife populations, which are naturally limited by the amount of existing water, would limit their population levels. There would be no new artificial water developments to supplement wildlife populations and subsequently no increased opportunities for visitors to observe and to hunt those specific wildlife species. There would also be less opportunities for plant and soil damage from wildlife populations, kept at unnaturally high populations levels due to the addition of artificial water developments.

Hunting of game species would continue throughout the Preserve, in accordance with state seasons and bag limits. Reptile and amphibian populations would benefit from the elimination of unregulated collection without a research permit. Hunting of nongame species, including coyotes, would be discontinued. It is unknown how many nongame species are killed each year in the Preserve, but it is believed to be relatively small. With no hunting pressure, coyote and other predator populations may increase temporarily, but would likely adjust over a couple of years and become self-sustaining. Some coyotes may become pests around campgrounds and public use areas due to illegal feeding by visitors. Some of these animals may have to be relocated or killed to protect visitor safety. Increased predation on deer and desert tortoise may occur as coyote and other predator populations increase, resulting in potential declines in their overall populations. However, some biologists believe that the presence of the deer attracts mountain lions, and results in increased predation on nearby desert bighorn sheep (J. Jaeger, 1994). Lower populations of the introduced mule deer may result in positive conditions for the native desert bighorn. A slight increase predation on desert tortoise by native predators would not be viewed negatively, unless the predator populations were artificially maintained at unnaturally high levels.

Removal of the burro population would cause short-term disturbance of the desert vegetation and wildlife due to noise (helicopters, horses, trucks, wranglers, etc.) and inadvertent trampling from capture crews and their equipment during the capture operation. Larger mammals such as deer and bighorn would leave the local area during these activities. If and when the third phase is implemented, burros would be killed at a time of year when tortoises are not active. This would limit the possibility of attracting ravens to the carrion that would prey upon young tortoises. Burros would be killed away from public view. As burros are eliminated and grazing is reduced, the noticeable disturbance to the landscape including overgrazing, fouling of springs and seeps, burro trails, and soil compaction would diminish over time. The burros' removal and reduction of cattle grazing impacts would hasten the restoration process.

Desert Tortoise. The recovery of the desert tortoise would likely be accelerated by implementing the proposed action, which addresses the management recommendations of the 1994 U.S. Fish and Wildlife Service Desert Tortoise Recovery Plan. Implementing the proposed action, in particular, elimination of the remaining estimated 630 burros, would have positive effects on the soil, water, vegetation, and wildlife, including the desert tortoise.

As grazing permits are acquired by conservation groups and donated, removal of cattle grazing would also result in positive effects to these resources. The elimination of grazing in critical habitat areas during tortoise active periods, unless ephemeral forage is present at 230 lbs./acre or greater, would preserve ephemeral forage for tortoise use during dry or semi-dry years. Tortoise would benefit from this proposal by not having to select less preferred forage with lower protein value during lean years. With populations stressed by many factors, having access to the highest quality forage without competition would improve the tortoise' s chances of recovery. Additional fencing may be required to implement this proposal, resulting in many new miles of additional fence in an area with hundreds of existing miles of fences.

Education and outreach efforts would improve public knowledge of tortoise life history and impacts, creating an awareness of human caused impacts. Such efforts should improve compliance with restrictions imposed, such as lowered speed limits and restrictions on camping in tortoise habitat. It would also raise awareness of issues such as parking in tortoise habitat during active periods and should result in fewer tortoises being killed inadvertently after crawling under vehicles for shade, if people learn to check under their vehicles.

Proposed actions to be taken to reduce raven subsidies would result in less potential for raven populations to remain above the natural levels, possibly reducing some juvenile tortoise predation. Participation in a regional study of raven populations would yield important information about levels of tortoise predation, and potentially, control methodologies, that could be implemented if necessary.

Some vehicle related tortoise mortality would continue to occur regardless of mitigating measures implemented. Where vehicle-related tortoise mortality is identified, some roads may be closed or speed limits imposed during periods when tortoises are most vulnerable to being run over by vehicles. Closing of unnecessary or duplicate routes in critical habitat, or temporary restrictions when needed during active periods, would provide an increased level of protection for the tortoise from being runover or collected. Installation of tortoise barriers in critical habitat areas that are bisected by interstates 15 and 40 paved roads would reduce the threat of vehicle mortality on these high speed, high traffic highways. However, barriers also further fragment the habitat, and increase the visibility of tortoises as they walk along the barriers, possibly increasing the threat of collection and harassment. In addition, negative effects on reptiles being trapped by these barriers have been observed in other areas. Actual benefits cannot be calculated because no data on the level of these threats are available.

Restoration of disturbed lands in critical habitat areas, and making acquisitions of private parcels in critical habitat a priority, would add habitat for tortoise conservation. Purchase of lands would remove them from potential development, thereby protecting them for tortoise use. Inventory of abandoned mine hazards and installation fences or covers on potential hazards, would protect tortoise from death or injury. Similarly, small game guzzlers that pose a threat to tortoise would be retrofitted or removed to prevent tortoise from drowning.

Until such time as research suggests benefits from fire in desert tortoise habitat, fires would be suppressed. Use of minimum impact fire suppression techniques would protect tortoise habitat from damage due to fire fighting, but would also mean fires would be suppressed, protecting the desert vegetation.

Participation in rangewide monitoring using protocols and methods adopted by agencies throughout the desert would generate necessary population data to determine if recovery objectives are being achieved. These efforts would also produce information about the spread of diseases through the population.

Hunting would be allowed when desert tortoise are mostly inactive on the surface (September–January). Restricting the hunting season would allow better control of illegal use of firearms in the nonhunting season. This alternative should result in fewer desert tortoises being killed and less cultural resource damage by vandals. Requiring dogs to be controlled at all times when used for hunting should minimize potential harassment of tortoise and the threat of diseases being transmitted by domestic dogs. Elimination of predator hunting might result in increased tortoise predation, especially vulnerable juveniles.

During the restoration of the Kelso Depot, most construction activities would not affect the tortoise due to the existing compaction and disturbance of the areas to be developed for parking and comfort station installation. Some new disturbance of potential tortoise habitat would occur during the installation of the septic tank and leach field, and the modifications and armoring of the flood control dike. The use of heavy equipment to reinforce the dike north of the Kelso Depot and place boulder rip-rap or other armoring on the face of the dike would disturb soils, vegetation, and wildlife habitat. To mitigate impacts, vehicles would be required to work to within the area that was disturbed when the dike was created. This area also functions as a drainage wash. Since the work would be done within desert tortoise critical habitat, a biological survey would be conducted before any work began to locate

and flag any active tortoise burrows. Equipment would be diverted around burrows where possible, or tortoises would be relocated to a safe area if necessary. A park biologist or contract biologist would monitor construction activity to keep equipment away from burrows and to locate any tortoises present at the construction area. Temporary tortoise barrier fencing would also be required around the construction site to minimize tortoise presence in the construction zone.

Other Sensitive Species and Habitat. Efforts to work cooperatively with other organizations and universities to inventory and monitor sensitive species and habitats would improve current knowledge of their distribution and current or potential threats. These efforts would provide data necessary to manage these populations and habitats in a manner that would protect and conserve them. Maintenance of the Mojave tui chub populations would be assured via a cooperative management agreement with the state.

Protection of desert bighorn sheep populations would be enhanced by recommended efforts to study impacts of climbing in the Clark Mountain area, and the potential effects of the proposed Ivanpah Valley airport. Bighorn would also benefit overall from current and proposed burro removals and grazing permit retirements due to the lack of grazing competition and use of springs by these non-native species. Some minor, short-term negative effects on bighorn may occur from the use of helicopters to round up burros in remote locations.

Climbing on Clark Mountain has the potential to impact desert bighorn sheep by stressing the population of animals that use the area. Herds of bighorn sheep can experience stress from foot traffic on trails through their home range. Such stress can cause displacement from these areas and resultant crowding among the herd. Crowding then causes disruption of crucial periods of feeding, resting, and ruminating. Stress during late pregnancy, lambing, and nursing may result in loss of adult and newborn animals. Sheep require escape routes in steep terrain to avoid predation. The presence of humans at the top of escape routes (as can occur in rock-climbing situations) may limit the amount of available escape terrain, thereby rendering sheep more susceptible to predation.

Specific climber/sheep interactions and impacts on Clark Mountain are unquantified at this time, but could be similar to those listed above. More information is needed on both climber and sheep use of the area, and how these uses relate to one another. As discussed in the proposal, Mojave would study climbing impacts on sheep. If the study revealed that climbing and other uses of the area were causing stress to the bighorn sheep population, Mojave would impose seasonal closures on visitation to Clark Mountain to prevent these impacts.

The possible closure of some campsites located in critical or sensitive habitat areas would reduce the potential for impacts on wildlife and plant species and other natural resources in these areas. Designating campsites with fabricated fire rings or markers and closing others in high use areas or sensitive habitats could reduce the negative impacts on soil, water sources, desert tortoise, vegetation, wildlife, cultural features, and other resources in sensitive areas.

Other than the desert tortoise, there are no known threatened or endangered species associated with the habitat that exist immediately around the Kelso Depot; therefore, no impacts would result.

If the National Park Service acquired additional historic structures, these buildings would be surveyed to determined if any endangered bat species would be impacted. Appropriate mitigating measures would be taken where needed.

Introduced Species. NPS efforts would increase efforts to identify invasive nonnative species and to implement efforts to control or eradicate them. These efforts would serve to preserve the native Mojave Desert vegetation and prevent loss of native species from nonnative competition.

The negative effects of burros in the Preserve and the positive effects of their removal are addressed under other impact topic headings. Under this proposed action, some burro presence would likely continue in the Clark Mountain unit, due to the presence of an adjacent BLM herd. As such, natural resource impacts associated with burro activity in this area may be reduced, but would not be completely eliminated in the short-term. The greatest continuing effects in the Clark Mountain area would be on soils and vegetation, with localized erosion, trailing, trampling, and overgrazing expected. As the removal project advances into helicopter and horse roundups, there is an increased chance of some burro deaths from stress. Measures have been adopted to minimize this potential.

The large athel tamarisk trees at the Kelso Depot may be related to the historic landscape and may be retained. Since these trees are not invasive and do not spread this action is considered compatible with NPS management policies for this historic site.

IMPACTS ON CULTURAL RESOURCES

Archeological sites, historic properties, cultural landscapes, and ethnographic resources in Mojave National Preserve would benefit from the proposed action through the implementation of a systematic and integrated inventory, research, and preservation program to protect, preserve, and interpret properties listed on, or determined eligible for listing on, the National Register of Historic Places.

Cultural resources may be adversely affected by vandalism or inadvertent damage resulting from an increase in visitation. Actions to mitigate these impacts would be initiated, as funding allows, including increased patrols, monitoring to detect vandalism and illegal collection, and an increased level of visitor education programs. Restriction on hunting seasons would allow more control of illegal weapon use during the non-hunting season and would enhance cultural resource protection from continued damage that has occurred from vandals.

The potential for burros and cattle to trample and damage or destroy cultural resources would diminish with this alternative. The number of cattle grazing within the Preserve would not increase, and as grazing permits were acquired by conservation groups and donated to the National Park Service, the land would be permanently retired from grazing. Consequently, the total number of working cattle ranches in the Preserve would decrease over time. Many people regard desert cattle ranching as a historical use; therefore, some people would consider a decline in the number of ranches a negative impact. If the National Park Service acquires private land or retires current leasing agreements, archeological and other cultural resource surveys would be conducted to identify and properly deal with existing features with cultural significance. A cultural landscape inventory and LCS survey should also be conducted in order to assess non-archeological cultural resources and determine their significance and eligibility for the National Register. The design of future facilities would mitigate negative impacts on identified significant cultural features according to appropriate NPS policies and standards.

The Kelso Depot restoration and rehabilitation proposal would result in the stabilization and preservation of this significant historical structure. The restoration of several important portions of the depot and the acquisition of historic furnishings for interpretive use would recreate and interpret the "heyday" of the depot as an important desert stop along the railroad. Adaptive use of other rehabilitated portions of the depot would serve to help preserve the depot, while also making

significant areas available for public education and interpretation, exhibits, and administrative use. Installation of earthquake retrofitting, heating and air conditioning, security, and fire control systems would protect the structure from further decay and threat of vandalism or fire.

Construction of a parking lot and comfort station, a short distance away from the depot would have a positive effect on the historical setting for the depot by removing the existing informal parking areas around the depot. A small parking lot for handicap use and deliveries would be constructed behind the depot in an area where parking historically occurred. Rehabilitating a historical landscape around the depot would also have a positive effect on the visual and cultural setting of the depot.

Cultural resources would not be affected by modifications to the existing flood control dike at Kelso. Construction work would be limited to soil that was previously excavated to a depth of up to 10 feet below the existing grade.

The potential future acquisition and subsequent restoration or stabilization of the historic Kelso general store/post office and/or the schoolhouse would have a positive effect on the historical setting for the town of Kelso. It would also help preserve these buildings. Failure to acquire them may result in their continuing deterioration, or potential modifications of the historic structures by the owners.

Potential construction of a roadside pullout and an interpretive path at the historic iron ore loading site at Kelso could disturb cultural resources in the ground. An archeological survey would be completed before site-specific design work to identify any archeological features and to mitigate negative impacts. People walking off paths at this historic site could adversely affect the resource. The interpretive program would provide messages about respecting cultural resources and staying on paths to minimize impacts. The site would benefit from actions to preserve it and indirectly from visitor education about the value of the resources.

Protection of historic and archeological resources and the cultural landscape at Soda Springs would benefit from actions proposed such as completion of the National Register nomination form, undertaking a cultural landscape and historic structures report, and from finalizing a cooperative management agreement with California State. Collectively, these items would ensure that resources are thoroughly documented and measures are taken to ensure their protection during use of the facilities.

Lands containing significant cultural resources important to the history of the Preserve could be acquired and protected by stabilization efforts and regular enforcement patrols. Bringing historic resources into public ownership would increase opportunities for visitors to enjoy these resources.

IMPACTS ON VISITOR USE, SERVICES, AND FACILITIES

The policy of minimal signs would provide for a visitor experience that preserves the sense of discovery. A variety of portable media (maps, tapes, guidebooks) would be available to enhance visitor safety, information, and comfort while travelling in the backcountry.

Opportunities to see burros in the Preserve would continue to decrease as burros are removed, but habitat would slowly recover, providing a long-term aesthetic benefit. Some visitors would consider the absence of the burros an adverse effect, but others would regard it as a positive effect. If the third phase of the burro elimination plan, killing burros, was carried out, some people would be offended. Visitor safety would improve with an expected decrease in the number of vehicle accidents involving burros or cattle. The use of helicopters over wilderness and other areas of the Preserve in the second phase of burro removals would have short-term negative impacts on the visitor experience. Some

visitors may be more significantly impacted if they happen to be visiting the Preserve during these periods and utilizing an area directly affected by helicopters.

NPS permitting of large groups using the Mojave Road (to reduce conflicts at campsites and avoid possible vehicle congestion) would positively affect the camping experience along the Mojave Road by ensuring protection of park resources and not allowing multiple large groups on the road at the same time. The quality of the camping experience would be improved by a decrease in crowding. The Mojave Road's surface conditions would be retained as near to current conditions as possible, or as determined in the proposed road management plan. Traffic flows would be somewhat regulated by the control of large groups. This action could also reduce the negative impacts on the surface conditions. Daily traffic levels would continue to fluctuate according to public interest in the Mojave Road. Allowing commercial tours of the Mojave Road would possibly increase use of the road, but would also make the experience available to visitors without the proper vehicle to travel the road.

Implementation of the proposal would improve conditions for the desert tortoise, increasing the potential for recovery. As populations increased, opportunities for visitors to see and experience desert tortoise would increase. Opportunities to learn more about desert tortoise would also improve.

An interpretive plan would result in a coordinated long-range program for interpretive development and direction. Ranger-led tours of Soda Springs would offer more visitor access to and information about the historic properties and the area's history. Improvement of the Soda Springs self-guiding tour and visitor structure would improve the quality of the visitor experience and encourage visitors to stay longer and learn more about the cultural, natural, and educational setting of this site. During 1996 the number of annual vehicle trips for visitors and California State University guests on the Zzyzx road was estimated to be between 2,000 and 2,500. If minor improvements were made to the visitor facilities at Soda Springs, this could cause a slight increase in traffic, dust, and normal wear and tear to Zzyzx Road. Impacts on university operations may result if visitor use is uncontrolled.

Visitor access to information would be improved by the proposed action to operate information centers in most gateway communities, as well as in the Kelso Depot. In addition to the existing information centers at Baker, Needles, and Hole-in-the-Wall, a secondary information center at the headquarters office would serve as an information service for the community and a base for an outreach program for local schools and groups. This operation could be similar to those established in Baker and Needles. Local residents near headquarters would not need to travel to Baker for information.

The rehabilitation of the Kelso Depot and its subsequent use as an information center would increase the number of informed visitors, possibly enhancing their experience and enjoyment of the Preserve. Because of its location at a critical crossroads in the Preserve, and the presence of exhibits and interpretive programs, many more visitors would be expected to stop and obtain information. In 1997, approximately 90% of all the Preserve's traffic passed through this intersection. Parking lot locations and designs would consider visitor safety, improving the existing random parking situation. The depot would be a good location for the NPS staff to interpret the area's natural and cultural resources and suggest ways that the public can help protect these features. As visitors received information on low-impact camping and as the maintenance staff managed adverse impacts, soil disturbance and impacts on vegetation from roadside camping would be minimized.

If passenger trains stopped at the depot, visitors that would otherwise be travelling through the Preserve without stopping would be able experience the depot's displays and exhibits. Visits by train passengers would need to be carefully coordinated to be successful, but it would provide an alternative transportation mode and reduce environmental impacts caused by automobiles. The potential of adding limited food service in the Kelso Depot might lead to increases in the duration of visitors' stay,

giving them more time to visit and experience the different parts of the Preserve. It also might give them an additional reason to stop at the depot and see the displays and interact with NPS staff. The food services might also be a distraction to the visitor center if it was not designed and operated in a way that would complement the primary visitor center functions.

Construction activities at the Kelso Depot would cause minor short-term adverse effects on vehicle traffic near the construction area and affect people' s ability to visit the depot. Currently, the public is only able to view the depot from the outside. Minor traffic delays might result from construction work. The construction contract specifications could be written to require the contractor to limit traffic delays to 10 minutes or less with exceptions for a few situations where more time would be needed. A temporary parking area with interpretive information could be created near the depot to inform people about the depot and the restoration. This would mitigate some of the impacts on visitors.

The proposed reinforcement of the dike near the Kelso Depot would mitigate potential threats from flash floods by increasing the protection against flooding at the depot. Establishing an early warning system to warn visitors about the potential for flash floods at the depot would further enhance the safety of visitors and NPS employees.

Opening of Kelso Depot as a museum and interpretive facility would increase traffic at the intersection of Kelbaker and Kelso-Cima roads, increasing the potential for traffic or train and pedestrian accidents. Placing crossing arms at the existing railroad crossing at Kelso could decrease the potential for collisions between vehicles and trains.

Public use of the Soda Springs (Zzyzx) area would be enhanced as the interpretive trail and media are updated and improved. No major changes to the research and educational use of the facilities are anticipated. Replacement of visitor facilities and upgrading the self-guided tour at Soda Springs might attract more visitors, creating potential conflicts between educational use and visitors. The National Park Service would seek a partnership with the California State University to collaborate on research, interpretation, and public education with the intent of increasing public awareness and understanding of natural and cultural resources in the Preserve and to reduce the potential conflicts between NPS visitors and university objectives.

Proposed modifications to the existing information center, picnic area, trails and roads at Hole-in-the-Wall would be done with the goal of improving visitor satisfaction by increasing interpretation, providing visitor information even when the facility is unstaffed, reducing the footprint of the facilities and roadways on the landscape, and restoring disturbed areas. The addition of a new loop trail would enhance recreational opportunities in the area.

The development of wayside exhibits along paved and maintained roads would enhance the visitor experience along the primary maintained travel routes, while maintaining the sense of discovery in the backcountry.

Restrictions on backcountry vehicle camping and day use might cause people to move into areas elsewhere within or outside the Preserve, increasing the level of use and crowding at those locations. As developed campground use increases, a reservation system may be adopted to manage visitor use. Some visitors may view this change negatively. Improving accessibility at some campsites and trails at Mid Hills campground for visitors with disabilities would allow more opportunities for these visitors to use these campgrounds. Potential establishment of new semi-developed campgrounds would impact soils and wildlife habitat during and after construction, but impacts on other undeveloped areas could be reduced by visitors relocating to semi-developed campgrounds.

Much of the actual and potential climbing resources in Mojave lie within wilderness. Under the Wilderness Act of 1964, mechanized equipment is prohibited, including the use of power drills to place bolts and other fixed anchors. Enforcement of this restriction would substantially curtail the number and amount of fixed anchors that would be placed in the Preserve. The overall number of new bolted climbing routes within Mojave would thus be minimized, while the quality of the existing and new routes would remain high.

Climbing on Clark Mountain would be limited if the results of the study on impacts of climbing to bighorn sheep determine that seasonal closures are necessary. This action would have minor short-term negative impacts on the climbing community during the closure, since the climbing season on Clark Mountain does not really get underway until the weather is fairly warm.

A ban on fixed anchors within 500 feet of the Hole-in-the-Wall visitor center would eliminate potential technical climbing in that area. The impact on the climbing community and other visitors using the area would be minor as climbers are not known to use the area now.

Non-hunting visitors would experience fewer disruptions and greater safety with the restrictions on the seasons, species, and areas where hunting would be allowed. Bighorn sheep hunters would not be affected by this alternative. Hunters of upland game birds, small game and deer would continue to experience only minor closures around developed areas. Eliminating hunting for nongame species would be a negative effect on those hunters. Trapping was eliminated by the passage of California Proposition 4 in 1998.

A visitor' s opinion of aesthetics might be influenced positively or negatively, depending on their perspective, by seeing ranching developments, guzzlers transmission lines and other authorized uses in an otherwise natural setting.

The National Park Service would try to limit any new incompatible development through acquisition of private parcels to provide permanent protection for the Preserve resources. If funds were not available for acquisition at the time the development is proposed, impacts would be similar to those of the existing management alternative. With the large number of private parcels in the Preserve, it is likely that some incompatible development may occur due to lack of sufficient funds to acquire all parcels. As private lands were purchased, more public lands would be available for visitor use and fewer incompatible development activities would occur in the Preserve. There would be fewer complaints from landowners about trespassing, and some fences could be removed, creating a more natural, open landscape. Visitors would be less confused about what lands they could use. Acquisition of nonfederal lands and interests would reduce potential for additional access restrictions by private parties.

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

A separate analysis of socioeconomic conditions in the planning area and the effects of the proposed action was conducted by Dean Runyan Associates under contract to the National Park Service (Runyan 1998). That analysis concluded that no significant effects would occur in the Northern and Eastern Mojave planning area as a result of the proposed action. There would be some loss of grazing related jobs if permits were acquired by conservation groups and retired by the National Park Service, but the overall effect would be offset by an increase in tourism jobs. Refer to that report for details.

Acquisition of private lands would remove those properties from county tax rolls. However, the federal government provides payments to the counties in lieu of taxes to provide some compensation

for the loss of taxes. This program is coordinated by the Bureau of Land Management and payments are made annually for entitlement lands and every five years for acquired lands. Payment is computed based on 1% of the amount paid for the property and does not fully replace the lost tax revenue. However, predicted increases in tourism over the next several years would likely replace much of this lost revenue through local and state sales tax and bed taxes.

IMPACTS ON ADMINISTRATIVE OPERATIONS AND FACILITIES

To fully implement the proposed general management plan over the 10–15 year life of the plan, including "Actions Common to all Alternatives," and assuming that all the activities proposed would be undertaken and visitor use increases, an additional 49 staff would be needed. This would require the addition of approximately $4 million per year for salaries, benefits, and administrative expenses (space, utilities, vehicles, etc.). This would result in a total staff of 92 and a budget of approximately $7 million in FY 2000 dollars. Full funding of all the activities, developments and projects would cost an additional $12.2 million, spread over the 10–15 year plan life.

The total cost of burro removal would be high. Mojave has already spent in excess of $800,000 on burro capture and removal. Due to high reproduction rates, many more animals than currently remain would have to ultimately be captured to reach zero. In addition, the last remaining burros are likely to be in remote locations, which dramatically increases their capture costs. The estimated 700 remaining burros that exist in the Preserve may cost over $500,000 to capture and remove, plus fencing costs.

Under the proposed action, a cost estimate for controlling burro population in the Clark Mountain unit of Mojave National Preserve is difficult to determine. Costs would include long-term management, removals, surveys, and fencing of springs and other sensitive resources. These costs would be high and long-term.

This alternative would result in higher administrative costs to implement the recommendations of the desert tortoise's recovery plan. These costs would diminish when the desert tortoise population was considered recovered. Potential construction of tortoise barriers along interstates and monitoring of the population are the most expensive aspects to the tortoise recovery proposal. Caltrans would incur the costs of fencing their interstate right-of-way. Monitoring costs could be lessened if a regional interagency team were funded and shared.

Oversight and management of the grazing permits would continue to require staff and budget until conservation groups are successful in purchasing the permits. Considerable work would remain on restoration, removal or maintenance of facilities for potentially several years.

Oversight of the mineral development program would continue to require staff and dollars to manage. Substantial staff time is required for inventory and reclamation of abandoned mines, conducting validity exams on existing unpatented claims, review and analysis of proposed mining plans, and monitoring of active operations and reclamation efforts.

Costs would result from inventorying, monitoring and administration of activities such as wilderness access, guzzler maintenance, water source monitoring, wildlife management, habitat restoration studies and work, law enforcement activities, managing camping restrictions at designated campsites, and construction of improvements to facilities for visitors with disabilities. The NPS administrative workload would increase with the added responsibility of overseeing the depot's food service concessions operation if it occurs.

Operating a Kelso Depot information center and interpretive facility, and possibly restoring or stabilizing the general store/post office and schoolhouse at Kelso, would increase NPS administrative workload and funding needs. Additional funds would be needed for facility operations, maintenance, and administrative functions at the depot. Using the general store/post office for interpretation and creating an outdoor railroad exhibit area would increase the demand for funding and staffing of maintenance and interpretive programs.

New or improved maintenance facilities at Baker and Hole-in-the-Wall would improve operation capabilities. By having storage and working space at both sites staff would avoid driving long distances for routine parts and supplies and could work more efficiently.

New or renovated housing in the Preserve would decrease the time for employees to get to their jobs and save vehicle fuel. The new housing would place an additional workload on maintenance staff. NPS housing at Baker would be made more energy-efficient where possible, but it would still not be up to NPS standards for housing until trailers are replaced. Improvements would cut down on high energy costs during the summer. New housing at Baker would reduce energy use for cooling at housing.

There would be a large initial administrative workload and cost to acquire properties. However, this workload would diminish over time as nonfederal lands came into public ownership. Some properties have buildings or other structures that may be adaptively used. If this happened, the Preserve might have to repair or upgrade the structures to bring them up to current code. Any structures used by the Preserve would require a long-term maintenance commitment. Properties acquired with existing disturbance (such as mines or corrals) might need to be restored or stabilized to preserve historic features. Major restoration work would be considered in separate detailed plans.

IMPACTS ON EDUCATION AND RESEARCH

Potential and existing research sites and educational opportunities in the Preserve are better protected now than at any time in the history of the area because national park units provide some of the best preservation available under federal law. Congress designated about half of the area as wilderness in 1994, which prohibits motorized access. Many of the actions being taken, or proposed by the National Park Service, would result in removal of nonnative species and restoration of the desert ecosystem. The removal of feral burros, retirement of donated grazing permits, elimination of target shooting and the staking of future mining claims have all improved the area' s research and education potential. The recent acquisition of the Granite Mountains grazing permit by the National Park Foundation, and subsequent donation to the Preserve for retirement, means the natural reserve is free of grazing for the first time in almost 140 years.

The potential for cattle and burros to disrupt or destroy research plots has been substantially reduced and would be further reduced under this alternative. Depending on the number of years of use and the investment in these plots, the positive impacts could be significant. The National Park Service recognizes the research communities continuing concern with protection of long-term research plots from vandalism and inadvertent visitor impacts. The proposal provides for working on these issues and concerns and development of solutions.

A shorter hunting season would slightly increase safety of researchers, students, and teachers. Designated campsites in sensitive areas would reduce the potential for negative effects on field research projects or sensitive resources.

IMPACTS ON LANDOWNERSHIP AND COMMERCIAL USE

Elimination of feral burros from Mojave would eliminate some resource use conflicts because burros would no longer use private and state lands within the Preserve for forage and water. A shorter hunting season would result in less trespassing and fewer hunting incidents. Landowners adjacent to ranches would experience less cattle trespassing and fewer resource conflicts. The National Park Service would cooperate with private property owners in placing signs or otherwise informing visitors about the need to respect private property.

The changes proposed in the management of grazing would adversely impact cattle grazing operations and may influence the future value of the permits. Restrictions associated with desert tortoise critical habitat would reduce the number of cattle and area that may be grazed. Ranchers would potentially face substantial costs associated with fencing critical habitat, possibly moving water developments and corrals, and moving cattle more often. Adoption of resource protection criteria could further limit grazing when certain resource conditions exist. The removal of burros would provide a potential benefit to ranchers by making more forage and water available for livestock use. Once a grazing permit is acquired by a conservation group and donated to Mojave, it would be retired no future grazing would be authorized for that area.

Impacts on mineral development activities would be the same as the "Existing Management Alternative."

CUMULATIVE IMPACTS

This alternative would establish policies and programs that would provide for the long-term recovery of the natural desert environment. The speed of this recovery would depend partially upon the speed of burro removal and the retirement of grazing permits. Impacts on native vegetation and soils as a result of cattle grazing and feral burros would decline substantially as regional plans for the management of public lands throughout tortoise habitat are approved and implemented.

Implementing this alternative (and a similar one for Death Valley National Park) would result in a large reduction in feral burro populations in the California Desert Conservation Area's public lands (a 64% reduction in the Bureau of Land Management's recommended herd management level). This reduction would be viewed negatively by some members of the public that enjoy the viewing of feral burros, since this opportunity would decline. Overall, while the result would be a major decrease in burro populations throughout the desert, it would result in improved native desert habitat conditions.

Impacts on burro populations from the potential loss of habitat and a possible increase in the number of injuries or deaths might result from proposed expansions at the Molycorp mine and the National Training Center at Fort Irwin. The number of animals affected at these locations is expected to be small but they would add to the proposed reduction at the units of the national park system.

The management program proposed in this plan would contribute substantially to the efforts to recover the entire desert tortoise population. Recovery efforts for the desert tortoise are underway or proposed in Arizona, California, Nevada, and Utah. Interagency cooperation in the management of burros and grazing, in monitoring of tortoise populations, and in studying and adopting raven control measures, would result in improved conditions for tortoise health throughout its range. These recovery efforts often include the retirement of grazing allotments. Grazing on desert public lands has been eliminated in parts of California (Pilot Knob), Nevada (Clark County), Utah (Upper Virgin River) as well as recent retirements in the Preserve. These existing efforts, the efforts proposed in this plan, and future

recovery efforts throughout the desert tortoise' s range would result in a significant reduction in the amount of livestock grazing in the Mojave Desert.

There are unknown consequences regionally on fire potential from the removal of grazers (burro and cattle) after over 140 years of their presence, and the subsequent recovery of native vegetation and possible proliferation of non-native plant species. Increased fuels would likely result from this action and may result in increased fire occurrence and intensity. Such a result could have adverse effects on tortoise habitat, and could threaten fire intolerant habitats, such as the Cima Dome Joshua tree woodland. The overall extent of these effects is not predictable.

This alternative would eliminate a large area from non-game hunting activities. This action would add to the elimination of hunting due to the expansion of Death Valley and Joshua Tree, and the reduced access caused by the creation of wilderness areas throughout the desert. This action provides fewer opportunities for the hunting community to recreate and causes them to drive or walk further to participate in their preferred sport. Together these actions would have a substantial negative impact on the hunting community that utilizes the California desert.

The creation of wilderness by the California Desert Protection Act closed large areas to motorized vehicle access, reducing roadside camping, but increasing the protection for natural and cultural resources in these areas. Eliminating vehicle-based campsites in sensitive areas and desert tortoise critical habitat would further reduce roadside camping opportunities. BLM may propose some additional route closures throughout the California desert in their plan amendments. Together these actions may cause some recreationists to relocate to non-wilderness areas, slightly increasing the use and potentially increasing the negative impacts in these locations.

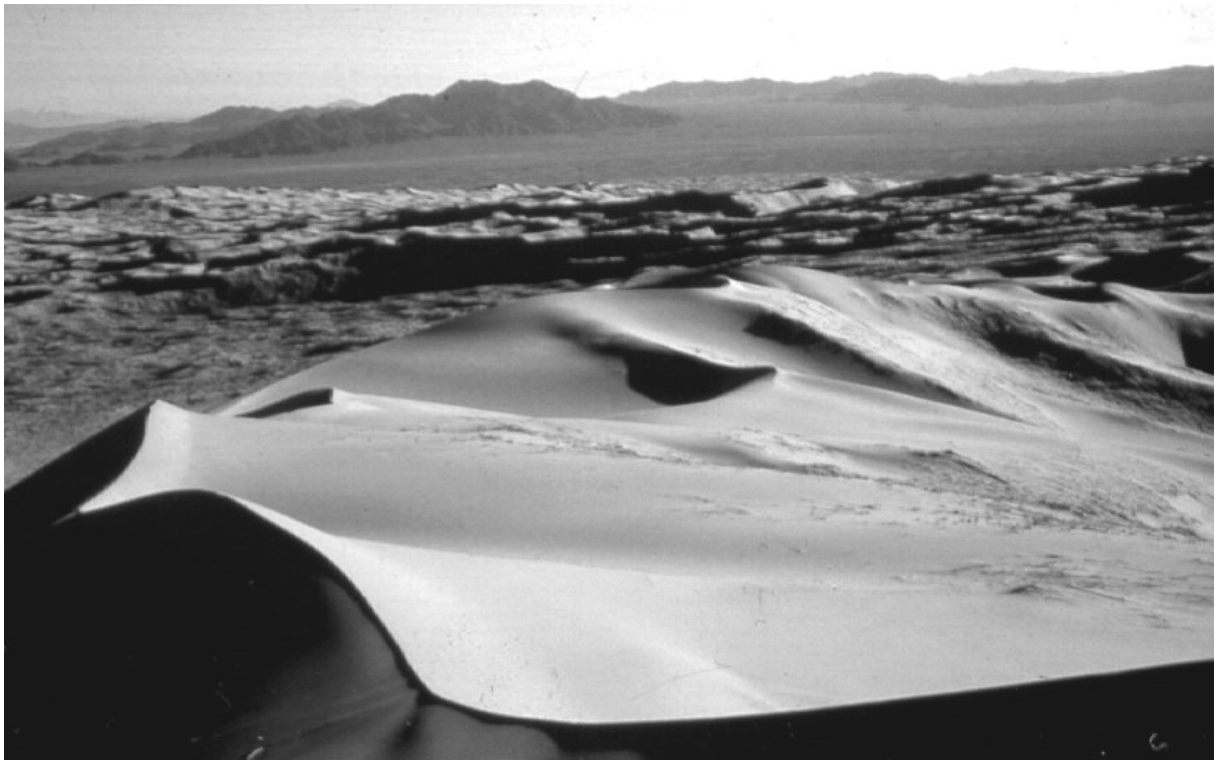
Opportunities for tourism based businesses in the region would increase as a result of the establishment of the Preserve and the expansion of Joshua Tree and Death Valley. As more people learn about the unique and unusual features of the desert, visitation to the region would continue to increase.

There would be less overall development of desert habitat and resources on a regional basis as up to 220,000 acres of nonfederal lands and interests in the Preserve were acquired. Potential disturbance due to mineral exploration and development would decline across the region due to the establishment of parks and wilderness areas and their closure to further mining claim location. Denial of mining proposals that do not meet NPS regulatory approval standards would contribute minimally to the existing situation where large expanses of the desert are no longer available for mineral entry, and therefore, development opportunities are restricted.

Cultural resources would receive enhanced protection throughout the region as agency management plans are adopted. Coordinated interagency studies and education efforts would improve the level of knowledge about cultural resources throughout the desert. Desert-wide acquisition of nearly 500,000 acres of Catellus lands would bring an unknown number of cultural resources into public ownership. As agencies throughout the desert implement restoration programs and retire grazing allotments, removal or alteration of some historic properties is likely to result, decreasing the overall availability of a finite resource. Overall, the affect on cultural resources from all the actions taken together would be positive.

A separate analysis of socioeconomic conditions in the planning area and the effects of the proposed action was conducted by Dean Runyan Associates under contract to the National Park Service (Runyan 1998). That analysis concluded that no significant effects would occur in the Northern and Eastern Mojave planning area as a result of implementing the proposed management plans in Mojave

and Death Valley. There would be some loss of grazing related jobs as permits were acquired by conservation groups and retired by the National Park Service, but the overall effect would be offset by an increase in tourism jobs. Refer to that report for details.



Kelso Dunes

ALTERNATIVE 2: EXISTING MANAGEMENT (NO-ACTION)

The impacts addressed below would result from continuing to manage the Preserve in the absence of a general management plan. However, this does not imply that no management would occur. Creation of the Preserve and wilderness areas in 1994 and management of the area under existing laws, regulations, and policies has already changed several factors that over the next few years would continue to enhance the recovery of the desert ecosystem. These are discussed in the alternatives, but include: elimination of new mining claim location and regulation of all mining activity; elimination of off-road vehicle use and driving in washes; elimination of competitive race events; elimination of target shooting; reduction of grazing by 5,751 AUMs (15%) through conservation group acquisition and donation of Granite Mountains allotment; and the removal of over 2,354 feral burros by the park since 1997.

IMPACTS ON NATURAL ENVIRONMENT

Most of the impacts on the natural environment under this alternative are due to the presence of nonnative feral burros and cattle grazing. However, potential development on private lands, external effects such as noise and light pollution from proposed development adjacent to the park, and the continuing impacts from past mining and other disturbance is currently or has the potential to adversely affect park resources.

Air. Air quality in the Preserve is typically good, but is often affected by wind-borne dust. Some of this dust is natural, but soil disturbance by human activities has exposed the surface and increased the amount of particulates that are lifted by winds. New disturbance, addressed under the soils section below, would add to this problem. However, restoration of abandoned mines and other disturbed lands, removal of mechanized vehicle use from closed roads in wilderness, increased enforcement of illegal off-road vehicles, removal of grazing from the Granite Mountains, and removal of 2,354 feral burros would reduce or eliminate some activities that are causing soils disturbance, and resulting in air quality impacts.

Visual Quality. Most of the large landscapes in the Preserve offer outstanding visual aesthetics of a natural desert ecosystem. Some of these landscapes also have cultural significance. However, modern day intrusions into these landscapes do exist. Large electrical utility lines running from Hoover Dam to southern California, and smaller local telephone and electrical lines, traverse the Preserve. A large pump station with several buildings exists along the Kelbaker Road near Kelso Dunes, servicing the natural gas pipeline that runs through the Preserve. The massive Viceroy Mine outside the Preserve, with its cyanide leaching heaps, intrudes on the landscape from many locations in Lanfair Valley as one views the Hart Mountains to the east.

Some historic developments also impact the visual quality, positively for some, negatively for others. The Union Pacific railroad corridor, in existence since 1902, traverses over fifty miles of the Preserve from Nipton, through Kelso and the Devil' s Playground. This line is very active, with an average of 25–30 trains per day. Trains are often visible and audible as one drives through the Preserve, or hikes in surrounding mountains. Existing or historic surface mines, like the Cima Cinder, Vulcan, and Coliseum mines, have severely modified the natural landscape. Due to their location however, they impact only those visitors that travel within the specific area of the Preserve where they are located. Ranching developments, such as fences, windmills, corrals, tanks, and structures are commonly seen throughout the Preserve.

Night Sky. Mojave currently has a night sky that is mostly free from light pollution that most residents of cities experience. Stars are highly visible and viewing them is a treasured visitor experience for many people who rarely get to see them as well. However, light pollution of the night sky is already visible from nearby developments in Primm and Laughlin. Baker also impacts areas of the Preserve within a few miles of it. Vehicle traffic on Interstates 40 and 15 is also visible at night from various locations in the Preserve. External lighting in Cima, Kelso, Hole-in-the-Wall, Zzyzx, the pump station along Kelbaker Road and at private homes in Lanfair Valley currently mark distant sources of development on the night scene and have little impact, other than localized.

Natural Ambient Sound. The Preserve is generally a quiet landscape, with occasional, short-term interruptions of the natural quiet. Depending on the atmospheric conditions, the closeness to a noise source, and topographic features, visitors would generally experience little noise while in the backcountry. Occasional overflights of commercial jets at cruising altitudes, small private aircraft, and rare military jets at low altitudes may be heard. Vehicle noise is generally not an issue within the Preserve in spite of the many heavily used roads (I-15, I-40, and major paved roads). Because of the Preserve's vastness, most areas are well away from traffic and its noise. Other areas where localized noise occurs are at the BLM Rasor Off Highway Vehicle open area, adjacent to the western boundary of the Preserve, the Union Pacific and Santa Fe rail lines, and mining operations. The Union Pacific and Southern Pacific railroad lines are heavily used and the distant rumble of freight trains is often audible when one is within a few miles, although the distraction is minimal.

Soils. Soils would continue to be affected to varying degrees by foraging of nonnative burros and cattle, and their subsequent trampling. Soil compaction, sheet erosion, and gullying would continue to be caused by burros wallowing and trailing (trails apparently produced by burros). The following quotation documents burro damage at other units of the national park system.

> Plant growth was inhibited and erosion accelerated in areas trampled by excessive burro concentrations (Ferrell, 1973). Douglas and Fenn (unpublished data) studied soil compaction in Death Valley by using bulk density sampling and soil penetrometer readings. They found treads of burro trails in Butte Valley (Death Valley National Park) were as heavily compacted as treads of relatively heavily used jeep roads in the same areas and soil type. Compaction extended 6-10 inches below the soil surface. The severity of soil compaction was surprising because soils in Butte Valley are granitic, and thus are relatively coarse and have poor compressibility. Heavily used burro trails on steep slopes in Death Valley and Grand Canyon have contributed to major soil movement and erosion. Carothers (1976) provides a discussion and illustration of burro damage in Grand Canyon along the Colorado River. Compacted trails are almost impervious to penetration by water; precipitation tends to run off compacted soils, leading to erosion. Compacted soils also are resistant to plant colonization. Hundreds of miles of such trails are present in Death Valley National Park and Lake Mead National Recreation Area" (Douglas and Hurst 1993).

The *Environmental Assessment: Clark Mountain Herd Management Area: Burro Management* stated that there was "excessive amounts of trailing and formation of dirt wallows by burros" (BLM 1996). Extensive burro trailing has also been seen in the Cinder Cones and Lava Bed areas of the Preserve. Since 1997 over 1,000 burros have been removed by the park in this area. Burro damage (wallowing, fouling, and plant destruction) to natural springs has been observed in the Ivanpah Mountains and in areas in and around the Granite Mountains.

Cattle also adversely affect soil. The U.S. Fish and Wildlife Service's April 20, 1994, Biological Opinion on the desert tortoise provided the following information of grazing/soil impacts:

> It [grazing] also causes soil erosion and compaction, reduced water infiltration rates, and increased runoff (Klemmedson 1956, Ellison 1960, Arndt 1966, and Gifford and Hawkins 1978), leaving less water available for plant production (Dadkah and Gifford, 1980). The intensity of damage to soil caused solely by cattle is assumed to be directly proportional to the AUMs (Animal Unit Months) of forage used per pasture (BLM 1980a).

Surface disturbance from roadside vehicle camping would likely expand from the area of previously disturbed sites without apparent boundaries being marked. This surface disturbance to soils and vegetation would continue to expand over time. Favorite camping sites would increase in size as use over the years expands the campsites out toward the undisturbed desert. Without an inventory of such sites, establishment of new illegal sites could occur. Visitor use of the Mojave Road would continue to create minor negative impacts such as dust and soil erosion.

Removal of the AT&T cable line across the center of the Preserve from Ft. Piute to Soda Lake in 1999 resulted in re-disturbance of soils that have been recovering since installation of the cable in 1963. Refer to the environmental impact statement for that project for a complete discussion of those impacts (National Park Service, 1999).

Construction of a parking lot and installation of a comfort station (vault toilet) would affect approximately two acres of previously disturbed soils in the Kelso Depot area. The area has been severely compacted and supports little or no native vegetation. The parking lot would be either paved or surfaced with crushed material, thereby stabilizing the loose soils and reducing windborne dust. This project would also cover these soils, preventing any future vegetation growth on the site.

Construction of wayside exhibits would result in approximately one acre of disturbance adjacent to existing paved or maintained dirt roadways. The disturbed surface would be either paved or surfaced with crushed material, thereby stabilizing the loose soils and reducing windborne dust.

The park may construct new support facilities such as field offices, maintenance facilities, an interagency fire center or employee housing. The park would conduct a separate site analysis and impact study to select specific construction sites. The park would focus on areas that mostly are previously disturbed and currently have existing development, such as the Cima area, Kelso, Hole-in-the-Wall or Lanfair Valley. Such development would likely result in less than twenty acres of disturbance throughout the Preserve.

Soils have been disturbed throughout the Preserve as a result of road establishment, mining, utility corridors, and unauthorized offroad vehicle use, especially in the area immediately east of the Bureau of Land Management's Rasor OHV Area. New mining under approved plans of operation, and continued illegal off-road vehicle use would continue to disturb soils. Mining operations would be addressed under separate impact analysis and permitting, and would include reclamation provisions to restore the site following mining.

Water. Many of the natural surface waters (springs and seeps) have been altered by ranchers, miners, the railroad, and others, to provide water for livestock grazing, mining, watering of tamarisk, and sand control by the railroad. Flows from springs and seeps were diverted or dammed, water was piped miles away from the source, wells were drilled, stock tanks were excavated, and other developments such as windmills and troughs were needed. These changes brought changes to the natural environment. When the flows from springs and seeps were diverted, the remaining aquatic/riparian flora and fauna were greatly reduced or eliminated. Water piped from the springs and seeps, or taken from wells and piped to tanks and troughs, is used by cattle, burros, and wildlife. Approximately 133 small game and 6 big game artificial watering devices (guzzlers) have been installed throughout the Preserve to provide water for wildlife use. Typically, these devices capture precipitation or surface runoff and store the

water for wildlife use. As a result, Mojave is a desert environment with many existing water sources that are accessible by wildlife and nonnative species, such as burros and cattle. An unknown number of these devices may be trapping and killing some species of wildlife, especially tortoise, when they enter the tank to drink, but are unable to exit due to a slippery tank wall. This situation would continue under the no-action alternative.

The land and vegetation near the ranching water troughs and tanks are subject to heavy, concentrated use by cattle and burros. This use compacts the soil and denudes the vegetation near the troughs and tanks. In many parts of the Preserve, miles of plastic water pipes (previously buried in shallow trenches and used to provide water for the cattle) that are no longer being used have been exposed and broken and now litter the desert. The effects on the soil and vegetation near the troughs and tanks and at the springs and seeps would continue with the implementation of this alternative.

Burros are known to contaminate water sources through defecation and urination, over-browsing or elimination of aquatic and riparian vegetation, and monopolizing the use of springs or seeps. On average, burros consume 22 liters (5 gallons) of water per day. In comparison, bighorn sheep consume about 3.8 liters (1 gallon) per day (Douglas and Hurst 1995).

Groundwater concerns stem from large-scale developments outside the Preserve and how they may eventually affect surface waters inside the Preserve. These include existing casinos and golf courses at Primm, and the Molycorp mine wastewater evaporation ponds on Ivanpah Dry Lake. Potential and existing groundwater drawdowns, and potential contamination of groundwater by mine, are primary concerns that the Preserve is tracking. Another groundwater drawdown concern exists on the eastern edge of the Preserve, where Viceroy mine is pumping approximately 11 million gallons per month from several wells just outside the boundary. A mine permit stipulation has required Viceroy to monitor water discharge at Piute Springs for the last several years. So far, significant effects have not been observed. However, the park remains concerned about future effects on surface water from this significant pumping of groundwater. Recently, another major groundwater proposal has surfaced just 15 miles south of the Preserve. This proposal, by Cadiz and Metropolitan Water District of Los Angeles, would take water from the Colorado River during times of excess and store it underground for use during lean times. However, the project would also have unknown consequences on Mojave' s springs and seeps due to extraction of groundwater.

Paleontology. Some unknown vandalism, illegal collecting or damage from burros and cattle grazing may be occurring. Current efforts to identify existing data and to begin inventorying sites would help provide needed information for patrolling and documenting the sites.

Geology. Overall existing impacts to geologic resources are minor and localized. Mining has caused the majority of the impacts. Some sites, such as the Coliseum open pit mine, have been extensively modified.

Caves. Unknown impacts are occurring to the lava tube. Documenting existing conditions and monitoring of changes would assist in identifying impacts and developing mitigation. Initiation of inventories at this and other caves would increase staff knowledge of the location and resource values, thereby improving protection.

Vegetation. Vegetation would continue to be affected to varying degrees by the nonnative burros and cattle foraging and their subsequent trampling of the soil and by camping activities. Burro removals and grazing permit retirements would help reduce overgrazing of the native vegetation. On average burros eat 4.5 kilograms (9.9 lbs.) of dry forage per day (Douglas and Hurst 1994). Normal plant growth patterns and rates would not resume with the presence of burros. Burro overgrazing leads to

less plant biomass available for native wildlife, thus a lowering of the habitat's carrying capacity (Woodward 1976).

Numerous studies documenting native vegetation damage from burros exist, and the findings are consistent; that is, burros damage native vegetation (see Douglas and Hurst 1994). However, the results of exclosure studies are not so definitive. Exclosures are fenced areas, that exclude the animals being studied usually for many years to determine the effects those animals have on vegetation and the environment by comparing the protected area to the area outside of the fence. Some investigators have noted large differences between the plant volume and diversity inside and outside of these exclosures; other investigators have noted no significant differences. The same parameters were studied, but the studies took place at different locations.

Douglas and Hurst cited Longshore and Douglas' (1988) research results where vegetation recovery was studied following burro removal. They found significant differences in species diversity, but no differences in mean volumes of perennial shrubs inside and outside of a Death Valley exclosure. They noted that, where browsing by burros was relatively minor, over a three-year period the rapid recovery of shrubs was evident. No recovery of the perennial grasses was noted. (In this research area grasses made up 48% of the burros' diet).

The interim burro population maintenance program (keeping the herd at the target level of around 130 burros) would result in periodic disturbance to the desert vegetation from inadvertent trampling of vegetation by burros and capture crews during the capture operation.

It is known that grazing can change the species composition and densities of vegetation. The following is from the "Biological Opinion" issued in 1994 by U.S. Fish and Wildlife Service on cattle grazing:

> Livestock grazing can result in decreased shrub cover (Webb and Stielstra, 1979) and desirable shrubs (Orodho et. al., 1990). Weedy exotics, such as split grass (*Schismus arabicus*), checker fiddle neck (*Amsinckia intermedia*), and filaree (*Erodium cicutarium*), and cheatgrass (*Bromus tectorum*) have benefited from grazing, while perennial bunchgrasses, which are highly palatable grazing forage, have become less abundant (Berry and Nicholson, 1984, Kie and Loft, 1990).

The restoration of the desert environment and its vegetation would be a slow process. Complete recovery, if it can happen, would occur at the very minimum over decades. Again, from the 1994 FWS "Biological Opinion":

> After 10 years of cattle exclusion in the Ivanpah Valley, there were no significant differences in annual plant cover, biomass, or density between grazed and ungrazed plots (Avery, et. al., 1992). Volumes of creosote and bursage were greater in the grazed plot as compared to the ungrazed plot, but no differences in total perennial plant cover were detected.

In the above study, differences were also observed in soil compaction, including greater compaction in the grazed area outside of the exclosure. The U.S. Fish and Wildlife Service noted that the above results were complicated by the "limited data on soil and vegetation parameters" before the cattle were excluded and that there had been trespass grazing inside the exclosure. The U.S. Fish and Wildlife Service also stated "Mojave Desert vegetation recovers very slowly from disturbance (Vasek et al. 1975a and 1975b, Lovich 1992) and 10 years may not be long enough to detect differences between grazed and ungrazed plots."

Most woody vegetation would continue to be protected from damage by the ban on firewood collection.

Wildlife. Competition for food, water, and space between bighorn sheep and burros is strongly suspected by many biologists, and overlaps of food and range are known to occur in Mojave National Preserve. Researchers have found dietary overlap between burros and bighorns ranging from 20% to 67% (Douglas and Hurst 1993). Douglas and Hurst cite the following from Norment and Douglas' s 1977 paper:

> The desert bighorn and burros live in areas having environmental uncertainty. It seems reasonable to assume desert bighorn are resource limited. Burros may also be resource limited, but because of their generalized food habits, they are less limited by forage resources than bighorn. In deserts of the western states, habitats of both species have continually fluctuating carrying capacities, being highest in spring and lowest in winter. Primary productivity of desert habitats is low, and dependent upon the amount and timing of precipitation. Availability of nutritious forage is thought to be the most limiting resource of these species. Foraging strategies of bighorn sheep have evolved in synchrony with their habitats, whereas feral burros have not evolved with the same resource set.

Studies in 1961 and 1984 showed that the presence of burros at springs has had an inhibiting effect on bighorn ewes; bighorn rams appear to be less intimidated. The findings were: "Ewes generally would not drink if 3 or more burros were present at the spring. Rams drank at the springs burros utilized, but a spring not used by burros received much heavier use by ewes than springs used by burros. Burros have the tendency to lounge in groups at water sources, often remaining there for hours, or even entire days" (Douglas and Hurst 1993). Such inhibiting of bighorns would continue under the no-action alternative, in areas where burros are not removed.

A 1977 study in Bandelier National Monument found significant differences in small mammal populations (deer, mice) in areas where burros were present. In the monument' s pinyon-juniper woodlands a reduction 10–33% of small mammals was found compared to the control areas that were without burros (Guthrie 1977). It is assumed that similar small mammal population declines have occurred within the Mojave National Preserve' s pinyon juniper woodlands (constituting about 10% of the Preserve) and within other community types that share burro and small mammal populations. Any such declines would continue under the no-action alternative.

The burro population maintenance program (keeping the herd at around 130 burros) would require periodic disturbance of desert wildlife by noise (helicopters, horses, trucks, wranglers, etc.) and inadvertent trampling of small animals and their habitats from capture crews and their equipment during the capture operation. Larger mammals, such as deer and bighorn, would leave the local area during these activities.

The Preserve' s developed water (wildlife guzzlers and other livestock water developments; mining developments) might be affecting the Preserve' s wildlife populations. This artificially increased amount of water may be allowing some wildlife populations to grow to levels unobtainable if only natural water was available. For example, there are no seeps or springs in the Kelso Mountains, yet a large herd of bighorn sheep is thriving, and this is probably due to the big game guzzler at Kelso Mountain. The population growth here and possibly at other locations might be affecting native vegetation. With more animals surviving because developed water is available, these larger populations would need more food. The limited amount of water available for plants, desert plants' slow growth and recovery rates, and the possible increased wildlife populations could have adverse ecological effects, because animals would be eating more than what is being replaced. This situation would continue under the no-action alternative.

Impacts on desert bighorn as a result of the climbing policies would be similar to those in the proposed action, except that potential impacts on bighorn sheep from the presence of climbers, and to a smaller extent, other visitors, would continue unabated on Clark Mountain.

Hunting is allowed year-round and there are no limits on the killing of hares (black-tailed jackrabbits) and many nongame animals such as coyotes, skunks, and opossum. The effects on these populations from hunting are unknown. The presence of the nonnative chukar may be having some negative effects on the native populations of quail by occupying habitat and consuming food that these birds would otherwise have available to them. The collection of reptiles and amphibians under a California State fishing license is having unknown effects on these populations, but for uncommon species, and with no monitoring of the populations by the state or the National Park Service, this practice could be harmful to some species.

Desert Tortoise. No new comprehensive population inventories or monitoring of desert tortoise has occurred since the publication of the recovery plan in 1994, although USGS scientists have continued studies in Ivanpah, and recently in Goffs. In 1994, the Ivanpah population was estimated at 5 to 250 tortoises per square mile, with the highest densities occurring over about 20 square miles in the southern end of the valley. Most of the remainder of the critical habitat in northern Ivanpah Valley, Kelso and Shadow valleys had densities generally less than 50 per square mile. A few tortoises tested positive for upper respiratory tract disease (URTD) during 1991. No statistically significant changes in the population density were observed from the 1970s to 1990 (Berry 1990, as amended). In the Fenner and Clipper valleys, the recovery plan reports tortoise densities of 50–100 tortoise per square mile west of Lanfair Road, and about 50 per square mile to the east of this road. Changes in the population status, positive or negative, may be occurring, but are not being detected due to the lack of a monitoring program.

The 1994 USFWS "Biological Opinion" describes the adverse effects burros can have on the desert tortoise. The USFWS report says that grazing by burros can damage soil crusts, reduce water infiltration, promote erosion, inhibit nitrogen fixation in desert plants, and provide a favorable seedbed for exotic annual vegetation. The U.S. Fish and Wildlife Service recommended that burros should be prohibited in areas set aside for the desert tortoise's recovery. There are two category I critical habitat areas established in the Preserve, covering about 48% of the Preserve.

Some observations of tortoises being crushed by livestock exist in the literature, but often with little or no data to allow in-depth evaluation. In addition, there are a few cases documented in the literature of livestock trampling of burrows (Boarmann 1999). However, little is known of the effects on individual tortoises from trampling of burrows, and nothing is known of the trampling effects on desert tortoise populations in general. While the actual effects of grazing in Mojave on the desert tortoise remain unclear, there is little evidence to suggest that trampling by cattle of individuals or burrows would cause a significant effect on the tortoise given the average stocking rates of about one cow per square mile.

A large part of the Mojave Desert is not in pristine condition, and some current conditions can be related to past grazing management practices. No information could be found on densities of the desert tortoise (*Gopherus agassizii*) or on vegetative conditions of areas that had not been grazed to allow managers a comparison of range conditions with data on tortoises. Experimental research information to assess the effect of livestock grazing on tortoise is lacking and researchers have not yet examined whether the forage that remains after grazing is sufficient to meet the nutritional needs of desert tortoises (Oldemeyer 1994).

The continued presence of cattle in desert tortoise habitat during dry years would presumably continue to cause changes in tortoise foraging habits, causing unknown impacts on their health and population. During highly productive springs with good ephemeral production (230 lbs./acre) there would seem to be little effect from cattle grazing on tortoise foraging. Research by Avery (1998) has documented that cattle grazing in areas where ephemeral forage is only 70 lbs./acre does result in feeding changes in the desert tortoise. Under this alternative, continued cattle grazing in desert tortoise habitat when ephemeral forage is 70 lbs./acre or less could negatively impact the tortoise by causing them to eat less preferred species. No research currently exists to conclude any effect in years with ephemeral forage production between 70–230 lbs./acre.

Actions taken by the Preserve to cleanup old landfills and to install raven-proof trash cans at public use areas would assist in preventing ravens from gaining access to human garbage in the Preserve. It is unknown whether these actions will have any significant benefit for the tortoise.

The continued use of dogs for hunting in desert tortoise habitat would result in occasional "harassment" of tortoise during the spring and warm fall months when tortoises may be active. Dogs that are hunting birds or rabbits and encounter a tortoise would be normally curious and may sniff, bark and paw at a tortoise, causing it to recede into its shell. Once losing interest, the dog would probably move on. If the encounter is with adult tortoise it would likely cause little impact. It is unknown if a dog would be likely to eat hatchlings that may be out. These small, soft-shelled tortoise typically hatch in August and would be very vulnerable.

The purposeful shooting of tortoises by vandals is uncommon in the east Mojave Desert, as compared to the west Mojave. Carcasses showing evidence of gunshots was 1.5% from the east Mojave versus 20.7% in the west Mojave desert (Berry 1986). Since the use of firearms for hunting is allowed year round in the Preserve, rangers and other visitors would have little way to determine if shooting was legitimate hunting or vandals. Some shooting of tortoise may occur under this alternative, but the number is not predictable.

Published reports have documented that many tortoises are killed each year by vehicles and trains. This source of mortality has been reported to impact tortoise populations from ¼–½ mile from the road (Boarmann 1999). While no studies in the Preserve have determined if this observation holds true here, occasional mortality due to motorized vehicles has been observed in Mojave.

Mojave has initiated the cleanup of several illegal dumps and waste sites that might serve as raven subsidizing. In addition, raven-proof trashcans have been installed at Kelso Dunes and have been ordered for the developed campgrounds.

Other Sensitive Species and Habitats. The park staff have collected basic information about the known sensitive species and habitats. No active program to inventory or monitor these populations has yet been adopted. Several laws, regulations and policies that are part of the designation of the area as a unit of the national park system and the designation of wilderness have substantially increased the level of protection of these species and habitats.

Introduced Species. Burros and tamarisk have been targeted for removal and control since they are the most invasive nonnative species in the Preserve. The feral burro population has been reduced by 2,354 animals. The negative effects of their presence and the positive effects of their removal are addressed under other impact topic headings. Tamarisk trees have been successfully removed at several riparian areas and efforts continue to eradicate them. Trees along the Union Pacific corridor are private property and are not believed to pose a threat of spreading.

IMPACTS ON CULTURAL RESOURCES

Cultural resources are potentially threatened by vandalism and by trampling from burros and cattle. Many prehistoric cultural resources are located near springs, since ancient peoples used springs. Known and undiscovered cultural resources at these areas might be trampled and destroyed by burros. Visitors camping or driving near isolated and unprotected sites would adversely affect cultural resources. Historic or significant structures could be adversely affected by campers' use of wood from historic structures for fires or by other acts of vandalism. Monitoring by rangers would continue to provide limited protection of archeological sites and ruins.

Historic properties listed on, or determined eligible for listing on, the national register would continue to be afforded stabilization/preservation treatment as funding allowed; however, preservation treatment would focus primarily on key resources in high-use areas. Background studies for rehabilitating and adaptive use of historic structures such as the Kelso Depot, would continue to be emphasized to ensure the preservation and interpretation of significant historic properties. The structural frame of the Kelso Depot would be stabilized under current plans, but the building would continue to be at risk to vandalism and deterioration as a result of not being completely restored and occupied.

IMPACTS ON VISITOR USE, SERVICES, AND FACILITIES

Drivers often travel over many of the paved roads in the Preserve at more than 70 mph. More vehicles on the roads, combined with fast speeds, would increase the chances for traffic accidents. Accidents with vehicles hitting burros or cows occur frequently. Often, the people in the vehicle are also injured. The numbers of burro/vehicle would be reduced as the Preserve approached the herd size of 130 would be implemented under this alternative.

Visitor access to the Mojave Road would continue to be unlimited. If road use increased, an adverse effect of excess wear and tear on the surface could result. Increased vehicle use would also lead to crowded roadside camping areas, excess dust, and less enjoyment of feelings of isolation, changing the quality of the visitor experience. The road's surface conditions would continue to deteriorate without NPS maintenance or volunteer efforts. Road shoulders and adjacent vegetation would be adversely affected if people drove off the roadway to avoid rough spots.

Creation of the Preserve in 1994 and management of the area under NPS laws, regulations, and policies changed several factors that enhance recovery of the desert tortoise. These are discussed in the alternatives, but include: elimination of future mining claim location and regulation of all mining activity; elimination of offroad vehicle use and driving in washes; elimination of competitive race events; elimination of target shooting; reduction of grazing by 5,751 AUMs (15%) through conservation group acquisition and donation of Granite Mountains allotment; and the removal of 2,354 feral burros by the park since 1997. Therefore, the habitat and conditions for tortoise recovery have been improved, providing greater opportunities for seeing and learning about the life history of the desert tortoise, thereby enhancing many visitors' enjoyment. Opportunities to learn more about desert tortoise have been improved through information dissemination at Baker, Needles, Hole-in-the-Wall, and the internet.

The public has limited access to historic properties at Soda Springs with the existing interim management agreement between California State University and the National Park Service. The recent replacement of the shade structure, comfort station and parking lot has improved visitor use orientation facilities.

Many visitors would continue to arrive in the Preserve without receiving advance information. Information panels installed at the six new entrance signs, information centers at Baker, Needles, and Hole-in-the-Wall, and the detailed information now available via NPS and other internet sites provides travelers with some basic information. Despite the availability of this advance information, many visitors still do not take advantage of these opportunities. A 1997 visitor study indicated that 46% of all visitors to the Preserve were visiting for the first time. This situation would continue to leave a large percentage of visitors with a limited amount of travel or interpretive information. There would continue to be a high potential for problems related to uninformed visitors travelling through a potentially harsh and unforgiving desert environment.

If campground use dramatically increased there could be some negative impacts on campers who could not get into full campgrounds during heavily visited periods, particularly spring and fall. These people might leave the Preserve or try to find a roadside camping site close to the developed campgrounds. Visitors with disabilities would be adversely affected at the Mid Hills campground because of the low number of accessible trails and campsites. Equestrian use at the Hole-in-the-Wall group area has been improved due to the recent addition of piped water at the corrals.

Impacts on the climbing community as a result of existing policies are similar to those in the proposed action with the following differences:

- Fixed anchors and climbing routes are less curtailed because power drills are currently allowed outside wilderness without a special use permit.
- Clark Mountain climbers are not currently restricted as to their season of use.
- More potential climbing routes could be developed because the entire Preserve is currently open to climbing and the placement of fixed anchors.

Cattle grazing and ranching activities, wildlife guzzlers, stock tanks, mining activities, utility corridors, and hunting and trapping would continue to influence visitors' enjoyment and perception of aesthetics in an otherwise natural setting of a unit of the national park system. Under this alternative, hunters continue to enjoy taking of big game, small game, and nongame species such as coyote, fox, skunk and other predators, year-round or under state regulated seasons, bag limits and other restrictions. Visitors who are disturbed by these activities currently have no period of time in Mojave when they are able to visit the area and not have the potential to encounter hunting activities. Visitors unaccustomed to encountering other visitors with firearms, at campgrounds, along trails, or in the backcountry, may feel uncomfortable and choose to move to another area or leave the park. Visitor safety while in the backcountry during active hunting seasons where long range rifles are used may be diminished if they are unaware of hunting season and do not wear bright colors.

Visitors would also encounter new and existing private development activities such as mining, house building, and potentially hotels and other visitor service facilities that could be in conflict with the Preserve's purpose. The National Park Service does not regulate development on private lands except for mining on patented claims and landfills on all lands. Therefore, the National Park Service would try to protect the Preserve's resources through the state and county permitting authority. With almost 14% of the Preserve containing nonfederal lands or interests, trespass by visitors on private lands could occur, along with a possible corresponding increase in fencing and "no trespassing" signs. At the same time, there is some concern that visitors would not understand the fencing of public lands for grazing, and therefore would feel unwelcome to use certain public fenced lands. Visitors leaving gates open or vandalizing ranching developments have caused increased costs and labor for ranchers to repair the damage and gather cattle.

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

A separate analysis of socioeconomic conditions in the planning area and the effects of the proposed action was conducted by Dean Runyan Associates under contract to the National Park Service (Runyan 1998). Refer to that report for details on the existing demographic and economic conditions in the planning area. That report shows that creation of the Preserve would attract new visitors to the area, creating both direct and indirect jobs in the region. New NPS employees have moved into several communities around the region, also enhancing the economy of the area.

IMPACTS ON ADMINISTRATIVE OPERATIONS AND FACILITIES

Maintaining a herd size at 130 burros would be the most expensive alternative over the long term. BLM personnel estimate the cost for capturing, transporting, adoption preparation (veterinarian care, feed and board), and adoption is $1,200 per animal (Dave Sjaastad, BLM, pers. comm. 1997). NPS removal and transportation costs since 1997 have been closer to $400 per animal due primarily to the success of water trapping. The cost of reducing the remaining herd down to the herd management level of 130 from the estimated population (June 2000) of approximately 630 burros would be about $500,000 assuming a cost of $800 per burro for helicopter and horse roundups. If the burro population's growth rate (estimated between 10–30%) is assumed to be 20%, an average of 26 burros would have to be removed each year, costing an estimated $13,000–20,000 per year, not counting staff time, in order to maintain a population of 130 animals. Under this alternative, these costs would continue for the long term.

The grazing fees collected under this alternative would not be sufficient to manage a grazing management program. Additional funding from NPS base funds would be needed for staff time and program costs associated with the grazing program.

Implementing the desert tortoise recovery program would entail some initially high administration costs, but the costs should diminish as recovery proceeded. Administering wilderness access for guzzler and ranching developments maintenance would result in high administrative review, permitting, and monitoring costs. Authorized vehicles would continue to be allowed access into wilderness. Year-round hunting would result in minor increases in workloads and costs for law enforcement activities.

Campground maintenance and fee collection would continue with existing staff and volunteers. Improvements made to the campgrounds such as new comfort stations and water systems should reduce maintenance because newer systems would have less breakdowns and repairs.

NPS housing at Hole-in-the-Wall and other areas for field staff would continue to be inadequate for staff use. The Hole-in-the-Wall contact center one room apartment provides little privacy and would not be adequate for the staff needed to operate the facility. Housing to provide onsite emergency response for medical and maintenance emergencies would not be available. Potential acquisition and donation of grazing permits by conservation groups may provide some housing units that the park would consider upgrading to meet current code and NPS housing standards.

Firefighting staffing levels may increase. The dormitory housing at Hole-in-the-Wall is already over capacity. Any increase would place the fire crew in even more overcrowded conditions. The existing structure is in poor condition. The garage for the fire truck is too small to properly park the truck and hold and protect support equipment. These conditions could be resolve if funding is provided to replace the fire center dormitory and garage.

The lack of a comprehensive general management plan would leave the National Park Service in the situation of managing the new park under applicable laws, regulations, and policies with no overall guiding document or vision. This could result in many projects being proposed and considered without the benefit of an overarching strategy that would suggest whether the projects would achieve the management objectives for the unit.

IMPACTS ON EDUCATION AND RESEARCH

Research and education in the Preserve are better protected now than at any time in the history of the area because national park units provide some of the best preservation available under federal law. Congress designated about half of the area as wilderness in 1994, which prohibits motorized access and use of mechanized equipment. The National Park Service is actively removing feral burros from the area, no target shooting is permitted, and the staking of future mining claims has been eliminated. Dumps are being cleaned up and hazardous waste sites are being remediated.

Cattle grazing, feral burros, and visitation could disrupt or destroy research plots. Depending on the time and cost of these plots the impacts could be significant; however, no evidence of damage has been reported.

Long-term field research projects could be adversely affected by visitor recreation activities. The public is generally unaware of the reserve' s research and education function, so that conflicts could develop between the public and researchers, teachers, and students who use the Granite Mountains Natural Reserve and Soda Springs areas. However, the public visiting parks is generally supportive of research and education activities, and the NPS outreach program into local schools and organizations would begin to educate the public about the park mission.

There is minimal conflict between the public and education and research within the Preserve because of low visitation to Soda Springs Desert Study Center and the Granite Mountains Natural Reserve. Some visitors to Soda Springs might continue to stray from the interpretive trail because of limited information placed along the trail and their interest in historic buildings. To mitigate such effects, more interpretive information could be placed in front of the historic buildings to interpret their past and explain their current functions. Illegal OHV trespass from the adjacent BLM Rasor OHV area near Soda Springs would continue to result in some level of trespass and possible vandalism of facilities and research plots in the area.

Some research and education entities have experienced an increased level of paperwork associated with conducting activities in the Preserve. NPS policies and regulations regarding research permits, groups size and the creation of wilderness by Congress has altered some of the activities and motorized access to areas that the research and education community previously enjoyed.

IMPACTS ON LANDOWNERSHIP AND COMMERCIAL USE

The lack of an acquisition budget would continue to frustrate the more than 300 willing sellers of private property that have approached the National Park Service about selling their property.

There is potential for increased visitation in the Preserve. Installing six information panels near the entrance signs now provides limited information about the Preserve. The signs are a reminder for visitors to respect private property and possibly reduce some conflicts between the public and private landowners.

Unoccupied public and private structures could continue to be subject to theft and vandalism. However, new NPS field staff has provided an increased presence in the Preserve, which would help reduce incidents.

No negative impacts on landowners would be anticipated from construction in the Preserve on federally owned land or on leased private land.

Feral burros and cattle would continue to present some resource use conflicts. Burros would use forage and water on unfenced private and state lands within the Preserve resulting in increase expenses for ranchers to run and maintain gas-driven pumps to fill stock tanks with well water. The significance of these impacts is unknown. As current removals approach the target of 130 animals this impact would diminish substantially.

Mitigation for proposed mineral development proposals do not meet the regulatory approval standards for the Preserve, the National Park Service would seek to acquire the property or interest. Depending on the mineral commodity and value of the property, this could result in a substantial expense. It would also prevent the removal and use of that mineral. The significance of this cannot be determined until a specific mining proposal actually is denied.

CUMULATIVE IMPACTS

The California Desert Protection Act of 1994 substantially changed the future management of the desert. Over three million acres of new park lands were created (including 1.6 million at Mojave) and many wilderness areas were designated, including 69 BLM-managed wilderness areas. In addition, the listing of the desert tortoise as a threatened species, the designation of critical habitat, and the preparation of the Recovery Plan have resulted in vast changes to federal, state and private land management and development over the last six years. There is now interagency planning and cooperative management teams focusing on desert tortoise issues across four states. Some plans have been completed in Nevada and Utah, and management strategies are being implemented.

The current management of the Preserve under NPS laws, regulations, and policies has changed several factors that over the next few years would continue to enhance the recovery of the desert ecosystem. These are discussed in the alternatives, but include: elimination of new mining claim location and regulation of all mining activity; elimination of offroad vehicle use and driving in washes; elimination of competitive race events; elimination of target shooting; reduction of grazing by 5,751 AUMs (15%) through conservation group acquisition and donation of Granite Mountains allotment; and the removal of 2,354 feral burros by the park since 1997. Death Valley, Lake Mead, BLM and the military have also been removing feral burros from their lands, resulting in overall declines in populations desertwide. However, authorized populations on BLM herd management areas still exceed their management levels in most areas. Therefore, the overall population of feral burros remains higher than allowed.

Restoring native landscape to its original condition would be inhibited by the combined effects of burros and cattle both inside Mojave and on adjacent BLM lands on soils, water, flora, and fauna. Failure to implement an interagency, desert-wide raven predation control program and continued delay in the funding of cooperative monitoring activities may have negative effects on tortoise recovery. Mortality of tortoise along interstates and heavily-traveled paved roads throughout the area would continue to occur until measures were taken to reduce or eliminate this threat. Continuation of existing conditions could potentially result in slower recovery of the desert tortoise.

The cumulative impacts of the no-action alternative on archeological sites, ethnographic resources, and historic properties are difficult to analyze because there has been no long term monitoring program. Development near archeological sites would increase the likelihood of eventual inadvertent damage to the sites, resulting in a slow deterioration of resources over time. Even controlled excavation of sites would damage them because current methods, technologies, and research emphases cannot anticipate the needs of future researchers. Therefore, data recovery is usually regarded as only a last-resort option to preservation in place.

It is presumed that the significance and integrity of ethnographic sites would be diminished by increasing visitation because such sites become less suitable for ethnographic uses as more people congregate near them. Piecemeal inventory, evaluation, interpretation, and preservation of archeological sites, ethnographic resources, and historic properties and cultural landscapes would not enable the National Park Service to manage cultural resources in the Preserve in a manner consistent with the requirements of the National Historic Preservation Act or the National Park Service' s *Cultural Resource Management Guideline.*

The development of private and state lands in the Preserve would contribute to the overall loss of desert resources and habitat for native species. Potential road closures by landowners irritated by trespass and vandalism could reduce overall public access even further (beyond the closure of roads in wilderness areas designated by the California Desert Protection Act, and potential route closures for protection of sensitive species and habitat).

Denial of mining proposals that do not meet NPS regulatory approval standards would contribute minimally to the existing situation where large expanses of the desert are no longer available for mineral entry, and therefore, development opportunities are restricted.

Existing management actions throughout the southern California area, as a result of Congressional action, have resulted in major changes in the overall management of the federal lands. These effects are not the result of planning decisions made in this plan or other agency plans, but rather have resulted from implementation of laws and regulations based on actions of the Congress. Clearly, agency actions being considered in various management plans throughout southern California, which are intended to implement the laws passed by Congress, will result in major socio-economic changes throughout the desert. A separate analysis by Dean Runyan Associates (1998) suggests that these changes will result in increased jobs in tourism, with a smaller loss of grazing jobs.

ALTERNATIVE 3: OPTIONAL MANAGEMENT PLAN

The impacts of this alternative are the same as the proposed general management plan (alternative 1) except as described below.

IMPACTS ON NATURAL ENVIRONMENT

Air. The impacts addressed under this heading would be the same as the proposed general management plan (alternative 1), but construction related impacts would shift from Kelso to Cima.

Visual Quality. The impacts addressed under this heading would be the same as the proposed general management plan (alternative 1).

Night Sky. The impacts addressed under this heading would be the same as the proposed general management plan (alternative 1).

Natural Ambient Sound. The impacts addressed under this heading would be the same as the proposed general management plan (alternative 1).

Soils. Impacts on soils would be the least under this alternative, because burros would be eliminated from the entire Preserve, including the Clark Mountain area. Since fencing proposed could not occur until cattle grazing were removed however, impacts would be the same as alternative one for the near term. New facility development in the Preserve would be concentrated at one site in the Cima area, thus reducing disturbance elsewhere. Impacts on soils addressed under alternative 1 would not occur under this alternative, except for a small parking lot and comfort station.

Water. The impacts addressed under this heading would be the same as the proposed general management plan (alternative 1), except that water sources in the Clark Mountain would be protected against contamination by burros. Since fencing proposed could not occur until cattle grazing were removed however, impacts would be the same as alternative one for the near term. Drilling for groundwater would not occur at Kelso, but would occur at Cima. Changes to the floodplain at Kelso to armor the existing dike would not occur.

Paleontology. The impacts addressed under this heading would be the same as the proposed general management plan (alternative 1).

Geology. The impacts addressed under this heading would be the same as the proposed general management plan (alternative 1).

Caves. The impacts addressed under this heading would be the same as the proposed general management plan (alternative 1).

Vegetation. Impacts on vegetation would be the least under this alternative, because burros would be eliminated from the entire Preserve, including the Clark Mountain area. Since fencing proposed could not occur until cattle grazing were removed however, impacts would be the same as alternative one for the near term. By eliminating the use of livestock feeding supplements, native vegetation would not be subjected to grazing use during drought periods, thus conserving palatable plant species that allow native herbivores to survive during periods of nutritional bottlenecks.

Wildlife. Water sources in the Clark Mountain area would be improved for wildlife use due to the removal of burros. The proposal to completely fence the Clark Mountain unit and then conduct burro

captures would likely be effective at eliminating all feral burros and their concomitant impacts from this area. This option, however, could also have a negative effect on the populations of desert bighorn sheep and deer that use the Clark Mountains and other nearby ranges. Deer and sheep use and occupy the Clark Mountains, but also migrate to other mountain ranges outside of NPS land at various times of the year. While attempts would be made to construct critical portions of this fence to allow sheep and deer ingress and egress, there are questions as to the effectiveness of this strategy. Impacts on the deer and sheep could include habitat fragmentation, loss of forage, stress, and mortality associated with entanglement in the wire portions of the fence. In addition, the fiscal costs of constructing and maintaining such a fence could be prohibitively expensive. Since fencing proposed could not occur until cattle grazing were removed however, impacts would be the same as alternative one for the near term.

Desert bighorn sheep would receive a maximum protection, as Clark Mountain would be closed to visitation during lambing season (February–June). This action would reduce potential stress to the population of bighorn that use Clark Mountain.

Allowing hunting of nongame species, except during spring months, would result in the continued shooting of coyotes and other predators. This alternative would likely result in no increase in predation on deer and other native species, including tortoise, by coyotes and other predators.

Desert Tortoise. Designation of critical habitat areas as Desert Wildlife Management Areas would not affect the management of them over the proposed action. It would only result in an additional name for an area already receiving protection. Adopting a no dogs off leash policy in critical habitat would ensure no harassment of desert tortoise and would reduce the potential for disease transmittal. A permanent reduction in the speed limit in DWMAs to 45 mph has potential to reduce mortality, but enforcement costs could be very high. Closure of 100 miles of road in critical habitat would prevent potential vehicle mortality and reduce the potential for illegal collection along those routes. Installation of additional tortoise barriers along paved routes would reduce tortoise mortality from vehicles, but it is unclear if the overall benefits to the tortoise would be substantial. Further fragmentation of habitat and possible increased collection would result, along with negative impacts on other wildlife, such as reptiles. Limiting roadside vehicle camping in DWMAs to certain designated sites would prevent proliferation of new sites and would reduce the possibility of tortoises being run over by crawling under parked vehicles for shade. Designation of critical habitat as ephemeral pasture would completely remove any potential threat to the tortoise from cattle grazing in these areas, except when ephemeral forage exceeds 230 lbs. per acre. At that level of forage, no competition between cattle and tortoise has been demonstrated.

Opportunities for public education and exhibits on desert tortoise at a central facility at key crossroads would not be realized if Kelso Depot were not rehabilitated for use as a central museum and interpretive facility.

Minor impacts on vegetation and wildlife would result from the construction of the following proposed projects:

- new housing in the Preserve and in Baker
- parking lot and comfort station at Kelso, mostly on previously disturbed lands
- visitor information center and employee housing at Soda Springs
- roadside pullouts for interpretive wayside exhibits
- restrooms, picnic tables, and fire rings at three new developed primitive campgrounds at Cima Dome, Granite Pass, and Kelso Dunes. Total disturbance from all three sites would be approximately six acres.

- a central facility in the Cima area that would provide for maintenance shops and storage, residences, office space, fire garage and dormitory and an information center.

Each of these projects would involve not more than 3 acres of disturbance. Using previously disturbed land would limit negative impacts in all locations.

Impacts addressed in the proposal regarding developments around the Kelso Depot would be reduced under this alternative.

IMPACTS ON CULTURAL RESOURCES

Impacts on cultural resources would be the same as the proposed general management plan (alternative 1), except the Kelso Depot would not be rehabilitated. Funds would be sought to stabilize the structure and prevent further deterioration. However, an empty structure with no use and limited maintenance would probably deteriorate more rapidly. The public would lose the opportunity to enjoy the interior of the structure, as only exterior interpretation would occur.

Restricting roadside vehicle camping locations would result in greater protection and less disturbance of existing archeological sites and sensitive cultural sites.

IMPACTS ON VISITOR USE, SERVICES, AND FACILITIES

Opportunities to see burros in the Preserve would be eliminated completely, although areas immediately adjacent on BLM land would remain.

Opportunities for visitors to enjoy a rehabilitated Kelso Depot would not occur. There would be no museum or interpretive exhibits to communicate to the public about the natural and cultural resources of the Preserve. Adding a central information center and ranger office at Cima would increase opportunities at this central location to communicate recreation and some interpretive information to the public. With emergency medical trained staff living onsite, it would also provide 24 hour emergency response for increased visitor safety.

Improving of interpretive trails and exhibits would enhance the visitor experience at Soda Springs. The addition of NPS employee housing would provide increased resource protection and reduce some of the potential vandalism that might occur with increased visitor use.

Additional wayside interpretive exhibits would enhance the visitor experience for many people by providing natural and cultural resources of the Preserve. For some visitors, too many signs and exhibits would also detract from the sense of self-discovery.

Adding a group camping area at Mid Hills would give groups a cooler summer alternative to the Hole-in-the-Wall area, which normally receives minimal summer use because of its hotter temperatures. Constructing hiking and interpretive trails to connect the campgrounds would increase recreational opportunities for visitors who preferred hiking on established trails. Visitors with disabilities would also benefit from the Mid Hills campground improvements.

Implementing a policy of limiting backcountry vehicle camping along dirt roads through desert tortoise critical habitat during tortoise active periods would limit opportunities for primitive camping. Restricting camping in desert tortoise critical habitat during periods when the animals were active

aboveground would adversely affect visitors during the spring months when conditions are prime for such camping. Alternate camping sites would still be available at many locations within the Preserve.

Establishing designated camping areas at remote locations would reduce the expanding surface disturbance associated with continued use. In the long term these facilities could decrease negative impacts from visitor use by confining impacts on specific campsites and reducing the potential for human waste in the landscape (Forest Service 1987). If tables were anchored to the ground, the potential spread of ground disturbance would be reduced even further. This would help reduce the potential for visitor disturbance of desert tortoises when the animals were active aboveground. However, it would not deter impacts on burrows and habitat the rest of the year.

Backcountry campsite improvements would increase the spectrum of camping opportunities in the Preserve. Some people might prefer to camp at these locations, which would have fewer people and more solitude than the developed campgrounds. This action could also reduce demand on the developed campgrounds. Adding improvements to backcountry campsites would adversely affect people who have been camping in these areas for years and would not want changes made to their favorite sites. Campers in high-use camping areas would benefit from the installation of improvements such as campfire rings and picnic tables.

The development of three small, primitive campgrounds would provide camping opportunities in new locations in the Preserve, compensating somewhat for the loss of backcountry camping sites.

Limiting vehicle use on the Mojave Road would mean that some visitors might not be able to use the road at their preferred time. The positive effect would be that the quality of the visitor experience and camping along the road would continue to be good. Large groups might be restricted from using the Mojave Road on certain dates, but they would be able to choose any previously disturbed campsite they want (based on availability). Some groups may be denied access to a section or all of the road if other large groups were using it on the same day. This would adversely affect groups that would not be able to travel when they wanted to, but it would overt problems with traffic congestion on this narrow road.

Visitors to the Granite Mountains would find increased information about the natural reserve and the NPS mission and purpose. Self-registration prior to using the area would probably not adversely affect many visitors' experience.

Impacts on the climbing community would be similar to those in the proposed action with the following differences:

- Allowing the use of power drills outside wilderness would increase the ease of placing fixed anchors, thereby improving climbing opportunities and increasing the overall number of fixed anchor climbing routes in Mojave.
- Climbing at Clark Mountain would be restricted upon approval of the *General Management Plan*, until the results of a desert bighorn sheep study were completed. A study could take several years, which would negatively impact climbers using the area. The restriction could be lifted depending upon the results of the bighorn sheep study, which would remove the impacts on the climbing community.
- No climbing would be allowed within 500 feet of the Hole-in-the-Wall visitor center. Impacts of this action would be minor or nonexistent to the climbing community.

Allowing the continued hunting of nongame species for about half the year would increase the satisfaction of the hunting community over the proposed action. Not allowing the use of firearms

during February–June would diminish methods of take, but would however, shortening the season when guns were allowed would increase visitor safety.

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

A separate analysis of socioeconomic conditions in the planning area and the effects of the proposed action was conducted by Dean Runyan Associates under contract to the National Park Service (Runyan 1998). This alternative would not result in significant changes to the socioeconomic conditions over the proposed action. Refer to that report for details.

IMPACTS ON ADMINISTRATIVE OPERATIONS AND FACILITIES

Implementation of this alternative would result in the need for additional funding, staffing, facilities and equipment to operate and maintain an administrative site at Cima, and to maintain all park roads now maintained by the county.

Implementing this alternative would necessitate NPS staff to operate new visitor information contact centers at Cima and Soda Springs, but overall less than alternative one without the Kelso Depot visitor center The availability of more information on recreational opportunities on a main road in the park at Cima might result in an increase visitation to features such as the Kelso Dunes, creating a ripple effect in needed administrative support for these areas. Increasing the number of NPS ranger tours and programs would also increase the administrative and operational workload for the National Park Service.

Expanding campgrounds, improving designated backcountry sites, and adding interpretive trails would create an additional staff workload. Construction would create a short-term increase in workloads, but additional campsites and camping areas would increase the daily work for years into the future. The additional improvements to backcountry sites would increase the distances the staff would be required to travel to maintain camping facilities.

If the park were to assume maintenance of 176 miles of paved roads and 79 miles of maintained dirt roads, an additional eight maintenance positions (permanent and seasonal) and $495,000 dollars would be required. In addition, a one-time expenditure of $1.1 million would be needed to acquire equipment and build facilities for material and fuel storage. The facilities would be constructed at the central Cima facility to put the equipment in a central location in the Preserve.

Monitoring and enforcing the Mojave Road' s vehicle capacity would require additional staff time and effort. This might eventually lead to a reservation or permit system, which could be used to control the number of vehicles on the road. This would be a negative impact on the administrative workload. Some work might be performed by private sector contractors. Using volunteers would reduce NPS efforts in road maintenance and care of roadside campsites.

IMPACTS ON EDUCATION AND RESEARCH

Adding an information center at Soda Springs (designed for an unstaffed operation) and NPS guided tours would increase visitation, creating potential conflicts between California State University and the public. Ranger-guided tours and interpretive displays and programs at the information center would provide information about scientific desert research.

IMPACTS ON LANDOWNERSHIP AND COMMERCIAL USE

New information centers at Cima and Soda Springs would provide additional opportunities for the public to receive information on park resources, including the need to respect private property.

Impacts on mineral development would be similar to the existing management alternative, except that increased acquisition of mineral rights would likely occur as a result of the sensitive resource analysis and the identification of areas where mineral development would be incompatible with the Preserve mission. This increase is not quantifiable at this time, however a separate impact analysis would be performed at the time the sensitive resource analysis occurs. Conducting the sensitive resource analysis would divert staff away from other higher priority issues such as desert tortoise recovery, grazing management, burro removals and validity exams.

Impacts on ranching operations would occur as a result of converting critical habitat areas to ephemeral use pastures. There would also be a corresponding decrease in perennial AUMs due to the decrease in available grazing acreage. While some permits may have sufficient area to move cattle and still maintain a viable operation, others may find it difficult to continue an economic cattle grazing operation in the Preserve (see table 23 below for details). Although it is not possible to determine at this point, some ranching operations may cease to be economically viable due to the substantially reduced number of cattle allowed to be grazed. Specific impacts of implementing this proposed concept would not be determined until a grazing management plan were prepared and this proposal is phased in over the next three years.

TABLE 23: AREA OF GRAZING PERMITS IN CRITICAL HABITAT

Grazing Permit	est. % within Desert Tortoise Critical Habitat
Colton Hills	70%
Gold Valley	0%
Round Valley	8%
Clark Mountain	2%
Kessler Springs	70%
Lanfair Valley	60%
Valley View	70%
Valley Wells	60%
Piute Valley*	90%
Total	

Retirement of the Clark Mountain and Valley Wells grazing permits would result in complete removal of cattle grazing from the Clark Mountain unit. These permits are small pieces (about 20%) of larger BLM grazing allotments that mostly lie outside the Preserve. The NPS portion of the Clark Mountain grazing allotment contains 371 AUMs (out of a total of 1,872 AUMs) and covers 17,500 acres. The NPS portion of the Valley Wells allotment contains 853 AUMs (out of a total of 4,644 AUMs) and covers 43,600 acres. Ranching developments would be removed and natural springs would be restored. This action would result in an unknown impact on the viability of the remaining allotment outside the Preserve due to the loss of about 20% of available grazing area. It would result in a cost to the National Park Service for fencing about 35 miles of Preserve, estimated at $1.5 million plus long-term maintenance costs. Fencing of the unit would result in further fragmentation of the desert habitat and potential interference with movements of bighorn sheep. The fence would be constructed using

the best available design to allow bighorn sheep passage, but may still result in some impediment to their movement. The fence would also impact the visual quality of the Clark Mountain area.

CUMULATIVE IMPACTS

Conversion of critical habitat areas to ephemeral pastures and adoption of the additional desert tortoise recovery measures in the Preserve would be similar to actions taken on adjacent BLM lands in California and Nevada. Overall, cattle grazing opportunities throughout the desert would decline as desert tortoise recovery actions are implemented. Although these changes would result in an overall decline in cattle grazing opportunities in the desert, proposed changes would only be implemented where willing seller conservation buyouts could not be achieved. Many ranchers would likely sell their permits at fair market value and reinvest in other ventures or continue ranching in other locations.

The eventual total removal of burros in the Clark Mountains would be a minor decrease in the overall decline of the feral burro populations throughout the desert.

OTHER COMPLIANCE REQUIREMENTS

The following is a list of mandatory topics that must be covered in a NPS environmental impact statement. Where relevant, additional information on these topics is covered in the proposed action and alternatives section of this draft document.

Possible conflicts between the proposed action and land use plans, policies, or controls for the area concerned (including local, state, or Indian tribe) and the extent to which your park will reconcile the conflict

The proposed actions would be in conflict with the current code of regulations of the California Department of Fish and Game. The National Park Service would consult with California Department of Fish and Game through this planning effort and seek new State regulations that reflect the changes once they are approved. No other conflicts are identified.

Energy requirements and conservation potential

Energy conservation would be a major design factor in any construction activity proposed in this document. National Park Service sustainable design criteria are proposed to be adopted.

Natural or depletable resource requirements and conservation potential

The actions proposed in this draft document promote the conservation of the Preserve's resources and the enjoyment of these resources by the public.

Urban quality, historic and cultural resources, and design of the built environment

Before the anticipated work on the Kelso Depot and the Preserve' s other historic structures can begin, the resources would be evaluated for their historical significance following historic preservation laws. This evaluation would be used in guiding the design for any future construction work.

Environmental justice (EO 12898) (socially or economically disadvantaged populations)

Any socially or economically disadvantaged population within the Preserve would not be adversely impacted by any of the alternatives presented in this document.

Wetlands and floodplains

Before any construction work begins in Kelso Depot, Mid Hills campground, or near the Hole-in-the-Wall area, floodplains and wetlands would be identified and appropriate mitigation included. A floodplain report for the Kelso Depot is included in the "Development Concept Plan." Spring (wetlands) restoration is part of the proposed action.

Prime and unique agricultural lands

There are no known extant agricultural lands within the Preserve.

Endangered or threatened plants and animals and their habitats

The Preserve' s sensitive species, including federally listed and state-listed endangered or threatened species have been identified. Specific actions are proposed to promote the recovery of the desert tortoise and the Mohave tui chub. Other sensitive species would not be adversely impacted by the proposed action. Inventory and monitoring commitments would serve to identify and map populations and identify threats to them.

Important scientific, archeological and other cultural resources, including historic properties listed on or eligible for listing on the National Register of Historic Places

The Preserve is fortunate to have two academic field stations within the Preserve. Significant archeological and cultural resources and a number of historic properties that are eligible for the National Register of Historic Places are also present within the Preserve. These features are described in the "Affected Environment," "Alternatives," and "Environmental consequences" sections of this document.

Ecologically critical areas, wild and scenic rivers, or other unique natural resources

Ecologically critical areas in the Preserve are desert tortoise designated critical habitat, Mohave tui chub ponds, and numerous unusual plant assemblages. These features would be protected through the proposed action of this document.

Mojave National Preserve carries out the NPS responsibilities for the national natural landmark (NNL) program associated with five areas: Cinder Cone Natural Area NNL, Mitchell Caverns and Winding Stair NNL, Amboy Crater NNL, Rainbow Basin NNL, and Turtle Mountain NNL. Each of these designated areas is a nationally significant natural resource warranting the highest level of protection and preservation from degradation of the characteristics that qualified it for designation as a national natural landmark. The National Natural Landmark program activities include annual inspection and reporting on the condition of the landmarks or threats to them and developing and maintaining partnerships with federal, state or other owners of the national natural landmark to promote their continued preservation and protection. Cinder Cone and Mitchell Caverns are within the Preserve's boundaries; the former is managed by the Preserve and the latter is managed by the California State Parks. Amboy Crater, Rainbow Basin, and Turtle Mountain are administered by the Bureau of Land Management.

Public health and safety

Public health and safety issues are addressed in this document. To promote public safety, the proposed action calls for additional public access to information regarding public health and safety and for restricting the hunting seasons, the number of species hunted, and the locations where they can be hunted.

Sacred sites / Indian trust resources

The National Park Service proposes to negotiate agreements with Indian tribes for the protection of these sites and resources.

SUSTAINABLE AND LONG-TERM MANAGEMENT

The National Park Service has a responsibility to sustain the land within its jurisdictional boundaries as a thriving ecosystem while preserving cultural resources and sustaining the quality of the human experiences that can be had on the land. Ecosystems do not recognize political boundaries; this fact may require the National Park Service to act upon external influences that could influence elements within the political boundary. The National Park Service is challenged to support the economic viability of the communities within and surrounding the Preserve while achieving environmental and cultural resource protection. The concept of sustainability recognizes that our world is dynamic, that change will continue to occur, and that the interrelationship between human beings and the environment must be considered in making decisions. Sustainability is a continual process, a way of thinking about now and the future, not a static set of characteristics that may be defined.

The National Park Service will apply the principles of sustainability to the management of all applicable aspects of this unit of the national park system from interpretation to development and management of facilities. Guiding principles include the efficient use of local resources such as water, energy, and materials to reduce waste, environmental impacts and management costs, and sustaining the quality of the visitor experience and life for local residents by maintaining scenic beauty, environmental quality, and visual harmony within the built environment and its surroundings. The National Park Service would also work with local communities to encourage economic activities that protect and improve the quality of the environment.

The relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity

Over the short term the implementation of the proposal would disrupt visitor services, some historic features, and a small part of the natural environment during construction and the roundup, moving, and adoption of burros. Over the long term, the proposed action would result in the elimination of burros, reductions in cattle grazing, and restoration of natural vegetation and water. To a slightly greater extent, the optional alternative would allow the natural habitat to recover faster. Over the long term, the no-action alternative would provide less opportunity for the natural habitat's recovery.

Any irreversible or irretrievable commitments of resources

Construction activities under the proposed action would have irreversible and irretrievable impacts. The construction of the various visitor and information centers, campgrounds, and the Kelso Depot, would not exceed 3 to 25 acres of habitat within the Mojave National Preserve. There would be no construction impacts under the no-action alternative and optional alternative impacts would be slightly larger (from 3–50 acres) than the proposed action. For all alternatives, any mining activity within the Preserve would permanently damage the natural environment. The extent of the damage would be mitigated, but some damage would still be present.

Future facility planning and management would also be directed by the National Park Service's *Guiding Principles for Sustainable Design* published in 1993 by the Government Printing Office. Sustainable actions could include reducing waste and water and energy consumption and improving or maintaining the quality of human experiences while reducing or eliminating impacts on the natural environment. Facilities must relate to the qualities of the surrounding landscape, local or regional architectural themes, providing a special sense of place. Continued operation of facilities would also be managed under sustainable principles such as high visitor satisfaction, easier maintenance, lowering operational costs, reducing waste, and reducing water and energy consumption. Facility planning and management would also comply with the Secretary of the Interior's Standards for Archeology and the Treatment of Historic Properties.

Any adverse impacts that cannot be avoided should the action be implemented

Between 3 and 50 acres of land in the Preserve would be lost to developments for visitor and maintenance use. If mining proceeded, those impacts would also be unavoidable. Hunting and trapping opportunities within the Preserve would be diminished with the selection of the proposed action or the optional alternative.

Hole-in-the-Wall